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CLUSTER OF DIFFERENTIATION (CD) ANTIGENS

● MOUSE CD ANTIGENS

Leukocytes express distinct assortments of molecules on their cell surfaces, many of which reflect either different stages of their lineage-specific differentiation or different states of activation or inactivation. These cell surface molecules of leukocytes are routinely detected with anti-leukocyte monoclonal antibodies. Clusters of antigens on the surface of leukocytes can be designated by their reactions with monoclonal antibodies. This designation of the antigens is called clusters of differentiation (CDs). Using different combinations of mAbs, it is possible to chart the cell surface immunophenotypes of different leukocyte subpopulations, including the functionally distinct mature cell subpopulations of B cells, helper T cells (TH), cytotoxic T cells (TC), and natural killer (NK) cells. Some CD antigens have a well-known function, but other CD antigens have no known function.

MOUSE CD ANTIGENS

Mouse CD antigens are listed in **Table 3.1**. Their gene, molecular weight, ligands, distribution, and functions are

● HUMAN CD ANTIGENS

shown in the table. For reference, alternate names of mouse leukocyte antigens are listed in **Table 3.2**. Non-CD antigens are listed in alphanumeric order in **Table 3.3**.

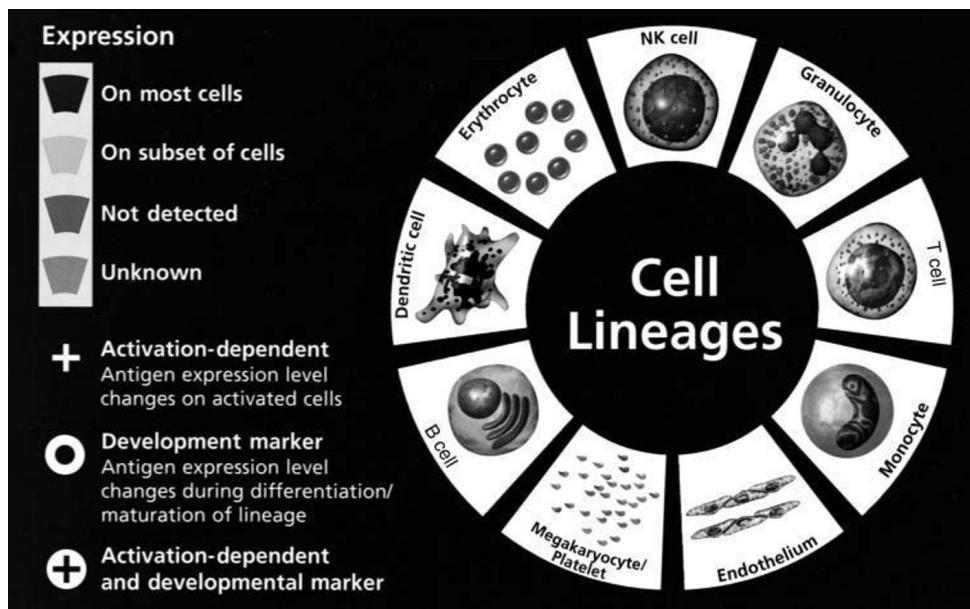
Table 3.4 is a detailed summary of mouse leukocyte antigen distribution depicting the presence of surface antigens on different subsets. Antigen distribution on hematopoietic stem cells, erythrocytes, epithelial cells, endothelial cells, NK cells, monocytes/macrophages, T cells, B cells, granulocytes, megakaryocytes/platelets, and dendritic cells is illustrated graphically in **Figures 3.1–3.11**.

HUMAN CD ANTIGENS

CD antigens established in the 7th International Workshop of Human Leukocyte Differentiation Antigens are listed in **Table 3.5**. This table provides information regarding their molecular weight, gene locus, ligands/receptors, functions, and distribution. An addendum describing HLDA family and main antigen expression is provided as **Table 3.6**. A list of abbreviations can be found inside the back cover of this book.

Table 3.1 Mouse CD antigen chart

Key



The distribution of activation-dependent and developmental cluster of differentiation (CD) markers on various cell types is presented in the following pages

Table 3.1 Mouse CD antigen chart (*continued*)

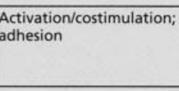
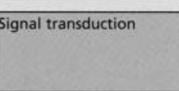
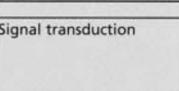
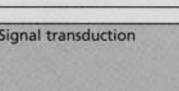
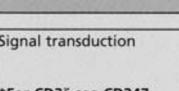
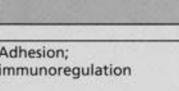
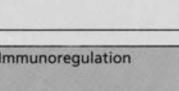
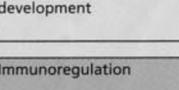
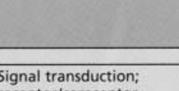
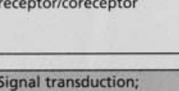
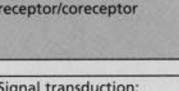
Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of			Antigen Distribution	Functions of Antigens
		Molecular Weight	Ligands/Substrates			
		Family/Superfamily				
CD1d 1B1, 3C11 CD1.1, CD1.2, Ly-38	<i>Cd1d1</i>	43-49 kDa CD1/MHC	lipid/glycolipid Ag			Antigen presentation
CD2 RM2-5 LFA-2, Ly-37	<i>Cd2</i>	45-58 kDa CD2 Ig	CD48			Activation/costimulation; adhesion
CD3 17A2 T3		T-cell receptor				Signal transduction
CD3δ CD3d, CD3 δ chain	<i>Cd3d</i>	T-cell receptor 20 kDa Ig				Signal transduction
CD3ε 145-2C11, 500A2 CD3e, CD3 ε chain	<i>Cd3e</i>	T-cell receptor 20 kDa Ig				Signal transduction
CD3γ CD3g, CD3 γ chain	<i>Cd3g</i>	T-cell receptor 25 kDa Ig				Signal transduction
CD4 GK1.5, H129.19, RM4-5, RM4-4 L3T4	<i>Cd4</i>	T-cell receptor complex 55 kDa Ig	MHC class II			Signal transduction; receptor/coreceptor
CD5 53-7.3 Ly-1, Lyt-1, Ly-12	<i>Cd5</i>		CD72			Adhesion; immunoregulation
CD5.1 H11-86.1 Ly-1.1	<i>Cd5a</i>		CD72			Immunoregulation
CD6	<i>Cd6</i>	100- and 128-130 kDa SRCR	CD166			Activation/costimulation; adhesion; differentiation/development
CD7	<i>Cd7</i>	40 kDa Ig				Immunoregulation
CD8a 53-6.7, 5H10-1 Ly-2, Lyt-2	<i>Cd8a</i>	T-cell receptor complex 38 kDa Ig	MHC class I			Signal transduction; receptor/coreceptor
CD8b H35-17.2 Ly-3, Lyt-3	<i>Cd8b</i>	T-cell receptor complex 30 kDa Ig	MHC class I			Signal transduction; receptor/coreceptor
CD8b.2 53-5.8 Ly-3.2	<i>Cd8bb</i>	T-cell receptor complex 30 kDa Ig	MHC class I			Signal transduction; receptor/coreceptor
CD9 KMC8 p24	<i>Cd9</i>	21, 24 kDa TM4				Activation/costimulation

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD10 R103 CALLA, MME, NEP	<i>Mme</i>	100 kDa Metalloproteinase		Peptides		Enzymatic activity; differentiation/ development
CD11a 2D7, M17/4 Ly-15, Ly-21, Integrin α_L chain	<i>Itgal</i>	LFA-1 180 kDa Integrin		CD54; CD102		Adhesion; differentiation/ development
CD11b M1/70 Integrin α_M chain, Ly-40	<i>Itgam</i>	Mac-1 (aka CR3) 170 kDa Integrin		CD54; iC3b; fibronectin		Adhesion
CD11c HL3 Integrin α_X chain	<i>Itgax</i>	p150, 95 (aka CR4) 150 kDa Integrin		iC3b; fibronectin		Adhesion
CD13 R3-242 Aminopeptidase N, gp150	<i>Anpep</i>	140-150 kDa Metalloproteinase		L-leucyl- β -naphthylamine		Enzymatic activity
CD14 rmCS-3 Mo2, LPS Receptor	<i>Cd14</i>	53-55 kDa Leucine-rich repeat		LPS/LPB complex		Receptor/coreceptor
CD15 SSEA-1, FAL, Lewis X	<i>Fut4</i>			CD62E?		Adhesion
CD16 2.4G2 Fc γ RIII, Fc γ RII α , Ly-17	<i>Fcgr3</i>	40-60 kDa Ig		mouse IgG		Ig Fc Receptor
CD18 GAME-46, C71/16, M18/2 Integrin β_2 chain	<i>Itgb2</i>	LFA-1, Mac-1, & p150,95 95 kDa Integrin		varies, see CD11a, b, c		Signal transduction; adhesion
CD19 1D3, MB19-1 B4	<i>Cd19</i>	CD19/CD21/CD81 complex 95 kDa Ig				Signal transduction; receptor/coreceptor
CD20 Ly-44, B1	<i>Ms4a2</i>	33-37 kDa CD20/Fc ϵ RI β				Activation/costimulation; differentiation/ development
CD21 7G6 CR2	<i>Cr2</i>	CD19/CD21/CD81 complex 150 kDa RCA		C3d		C' regulation
CD22.2 Cy34.1 Lyb-8.2, Siglec-2	<i>Cd22b</i>	140-160 kDa Siglec		N-glycolyl neuraminic acid		Adhesion; immunoregulation; receptor/coreceptor
CD23 B3B4 Fc ϵ RII, Ly-42	<i>Fcer2a</i>	45-49 kDa C-type lectin		IgE		Ig Fc Receptor
CD24 30-F1, J11d, M1/69 Heat Stable Antigen, Ly-52, Nectadrin	<i>Cd24a</i>	35-52 kDa		CD62P		Activation/costimulation; adhesion

Table 3.1 Mouse CD antigen chart (continued)

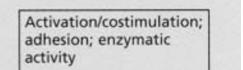
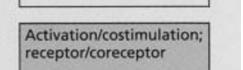
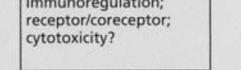
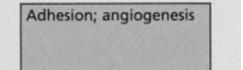
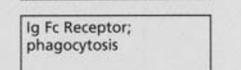
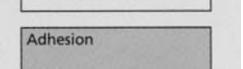
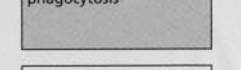
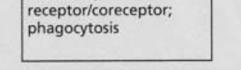
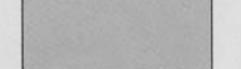
Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of Molecular Weight Family/Superfamily	Ligands/ Substrates	Antigen Distribution	Functions of Antigens
CD25 PC61, 7D4, 3C7 Ly-43, IL-2 Receptor α chain, p55	<i>Il2ra</i>	IL-2 receptor 50-60 kDa CCP-like	IL-2		Activation/costimulation; receptor/coreceptor
CD26 H194-112 Dipeptidyl peptidase, DPP IV, THAM	<i>Dpp4</i>	220 kDa Dipeptidyl-peptidase	Polypeptides		Activation/costimulation; adhesion; enzymatic activity
CD27 LG.3A10	<i>Tnfrsf7</i>	Homodimer 45 kDa TNFR	CD70		Activation/costimulation; receptor/coreceptor
CD28 37.51	<i>Cd28</i>	Homodimer 65-80 kDa Ig	CD80; CD86		Signal transduction; activation/costimulation; receptor/coreceptor
CD29 9EG7, KMI6, Ha2/5, HM β 1-1 Integrin β_1 chain, VLA β_1 , gp110	<i>Itgb1</i>	VLA-1-VLA-6; $\alpha_v\beta_1$, $\alpha_g\beta_1$, $\alpha_s\beta_1$, $\alpha_b\beta_1$ integrins 130 kDa Integrin	varies, see CD49a-f and CD51		Signal transduction; adhesion; differentiation/ development
CD30 mCD30.1 (aka 2SH12-5F-2D) Ki-1	<i>Tnfrsf8</i>	105-120 kDa TNFR	CD153		Immunoregulation; receptor/coreceptor; cytotoxicity?
CD31 MEC 13.3, 390 PECAM-1, gp110, endoCAM	<i>Pecam</i>	130-140 kDa Ig	CD38; vitronectin receptor		Adhesion; angiogenesis
CD32 2.4G2 Fc γ RII, Ly-17, Ly-m20	<i>Fcgr2b</i>	40-60 kDa Ig	mouse IgG		Ig Fc Receptor; phagocytosis
CD33 Siglec-3	<i>Cd33</i>	67 kDa Siglec	Sialylated glyco- proteins?		Adhesion
CD34 RAM34 (aka 49E8) Mucosalin	<i>Cd34</i>	90, 105-120 kDa Sialomucin	CD62L		Adhesion
CD35 8C12, 7G6 CR1, C3b receptor	<i>Cr2</i>	190 kDa RCA	C3b		C' regulation; phagocytosis
CD36 Scavenger receptor	<i>Cd36</i>	88 kDa Class B scavenger receptor	oxidized LDL		Adhesion; receptor/coreceptor; phagocytosis
CD37	<i>Cd37</i>	TM4			
CD38 90 T10	<i>Cd38</i>	42 kDa	CD31		Activation/costimulation; enzymatic activity
CD39 NTPDase-1	<i>Entpd1</i>		ATP; ADP		Enzymatic activity

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD40 HM40-3, 3/23 gp39 receptor	<i>Tnfrsf5</i>	45-50 kDa TNFR	CD154			Activation/costimulation; immunoregulation
CD41 MWReg30 Integrin α_{IIb} chain	<i>Itga2b</i>	$\alpha_{IIb}\beta_3$ integrin (GPIIb-IIIa) 105 kDa Integrin	Fibronectin; fibrinogen; von Willebrand factor; thrombospondin			Adhesion; hemostasis
CD42a GPIX	<i>Gp9</i>	GP Ib/IX/V Complex 20 kDa Leucine-rich repeat				Adhesion; hemostasis
CD42b GPIb α	<i>Gp1ba</i>	GP Ib/IX/V Complex 145 kDa Leucine-rich repeat	von Willebrand factor			Adhesion; hemostasis
CD42c GPIb β	<i>Gp1bb</i>	GP Ib/IX/V Complex 24 kDa Leucine-rich repeat				Adhesion; hemostasis
CD42d GPV	<i>Gp5</i>	GP Ib/IX/V Complex 88 kDa Leucine-rich repeat				Adhesion; hemostasis
CD43 S7, 1B11 Leukosialin, Ly-48, sialophorin	<i>Spn</i>	115 and 130 kDa Sialomucin	CD54			Signal transduction; adhesion
CD44 IM7, KM114, TM-1 Pgp-1, Ly-24	<i>Cd44</i>	85-95 kDa Core/link proteoglycan	hyaluronate; collagen; fibronectin; laminin; osteopontin			Activation/costimulation; adhesion
CD45 30-F11, 69 Ly-5, T200, LCA	<i>Ptprc</i>	180-240 kDa RPTP				Signal transduction
CD45.1 A20 Ly-5.1	<i>Ptprcα</i>	180-240 kDa RPTP				Signal transduction
CD45.2 104 Ly-5.2	<i>Ptprcβ</i>	180-240 kDa RPTP				Signal transduction
CD45R RA3-6B2 B220	<i>Ptprc</i>	220 kDa RPTP				Signal transduction
CD45RA 14.8	<i>Ptprc</i>	220, 235 kDa RPTP				Signal transduction
CD45RB 16A (aka C363.16A)	<i>Ptprc</i>	200-240 kDa RPTP				Signal transduction
CD45RC DNL-1.9	<i>Ptprc</i>	200-240 kDa RPTP				Signal transduction

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of			Antigen Distribution	Functions of Antigens		
		Molecular Weight		Ligands/Substrates				
		Family/Superfamily						
CD45RO	<i>Ptprc</i>	180 kDa RPTP				Signal transduction		
CD46	<i>Mcp</i>	41 kDa RCA	C3b			C' regulation		
CD47 miap301 Integrin-associated protein (IAP)	<i>Itgp</i>	β_3 integrins 50 kDa Ig	CD172a			Signal transduction?; activation/costimulation; adhesion		
CD48 HM48-1 BCM1, sgp-60	<i>Cd48</i>	45 kDa CD2 Ig	CD2; CD244; enteric bacteria			Activation/costimulation; adhesion		
CD49a Ha31/8 Integrin α_1 chain	<i>Itga1</i>	VLA-1 200 kDa Integrin	laminin; collagen			Adhesion; differentiation/development		
CD49b HM α_2 , Ha1/29, DX5 Integrin α_2 chain	<i>Itga2</i>	VLA-2 165 kDa Integrin	laminin; collagen; fibronectin			Adhesion; differentiation/development		
CD49c 42 Integrin α_3 chain	<i>Itga3</i>	VLA-3 Integrin	fibronectin; laminin; collagen			Adhesion; differentiation/development		
CD49d R1-2, 9C10(MFR4.B), DATK32, SG31 Integrin α_4 chain	<i>Itga4</i>	VLA-4 (LPAM-2), LPAM-1 150-155 kDa Integrin	VCAM-1; fibronectin; MADCAM-1; invasin			Adhesion; differentiation/development		
CD49e 5H10-27(MFR5), HM α_5 -1 Integrin α_5 chain	<i>Itga5</i>	VLA-5 135 kDa Integrin	fibronectin			Adhesion; differentiation/development		
CD49f GoH3 Integrin α_6 chain	<i>Itga6</i>	VLA-6, $\alpha_6\beta_4$ integrin (TSP-180) 120 kDa Integrin	laminin			Adhesion; differentiation/development		
CD50 ICAM-3	<i>Icam3</i>		Unknown in mouse					
CD51 H9.2B8, RMV-7, 21 Integrin α_v chain	<i>Itgav</i>	Vitronectin receptor; $\alpha_v\beta_1$, $\alpha_v\beta_3$, $\alpha_v\beta_5$ and $\alpha_v\beta_8$ integrins 125 kDa Integrin	vitronectin; fibronectin; fibrinogen; thrombospondin; von Willebrand factor; CD31			Activation/costimulation; adhesion; differentiation/development		
CD52 CAMPATH-1, B7	<i>Cd52</i>	12 kDa						
CD53 OX-79	<i>Cd53</i>	35-45 kDa TM4				Signal transduction?; differentiation/development?		

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of			Antigen Distribution	Functions of Antigens
		Molecular Weight				
		Family/Superfamily				
CD54 3E2 ICAM-1, Ly-47, MALA-2	<i>Icam1</i>	85-110 kDa Ig	LFA-1; Mac-1; CD43		Adhesion	
CD55 Decay accelerating factor (DAF)	<i>Daf1</i>	RCA	C3b; CD97		C' regulation	
CD56 N-CAM13, 12F8, 12F11 N-CAM	<i>Ncam</i>	120, 140, 180 kDa Ig			Adhesion; differentiation/ development	
CD59 Complement inhibitor	<i>Cd59a</i>	20-26 kDa Ly6	C5b-8		C' regulation	
CD61 2C9.G2 Integrin β_3 chain	<i>Itgb3</i>	Vitronectin receptor, $\alpha_{IIb}\beta_3$ integrin (GPIIb-IIIa) 95 kDa Integrin	varies, see CD51 and CD41		Signal transduction; adhesion	
CD62E 10E9.6 E-selectin, ELAM	<i>Sele</i>	110 kDa C-type lectin	E-selectin Ligand-1 (ESL-1)		Adhesion	
CD62L MEL-14 L-selectin, LECAM-1, Ly-22	<i>Sell</i>	74 kDa (lymphocytes); 95 kDa (neutrophils) C-type lectin	PNAad (CD34, GlyCAM-1, MAdCAM-1)		Adhesion	
CD62P Polyclonal, RB40.34 P-selectin, GMP-140, PADGEM	<i>Selp</i>	140 kDa C-type lectin	CD162; CD24		Adhesion	
CD63 ME491	<i>Cd63</i>	53 kDa? TM4			Differentiation/ development?	
CD64 Fc γ Receptor	<i>Fcgr1</i>	70 kDa Ig	mouse IgG		Ig Fc Receptor	
CD66a BGP, CEA-1	<i>Ceacam1</i>	Ig	CD62E?		Signal transduction; adhesion; angiogenesis	
CD66b CGM6, CEA-3	<i>Psg18</i>	Ig				
CD68 Macrosialin, lysosomal glycoprotein	<i>Cd68</i>	87-115 kDa Sialomucin, Lamp			Phagocytosis	
CD69 H1.2F3 Very Early Activation Antigen	<i>Cd69</i>	85 kDa C-type lectin			Activation/costimulation; differentiation/ development	

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of			Ligands/ Substrates	Antigen Distribution	Functions of Antigens			
		Molecular Weight		Family/Superfamily						
CD70 FR70 CD27 Ligand	<i>Tnfsf7</i>	30-33 kDa	TNF	CD27		Activation/costimulation				
CD71 C2 (C2F2) Transferrin receptor	<i>Trfr</i>	180-190 kDa		transferrin		Activation/costimulation; metabolism				
CD72 10-1.D.2, K10.6, JY/93 Lyb-2, Ly-m19	<i>Cd72</i>	90 kDa	C-type lectin	CD5; CD100		Activation/costimulation; differentiation/development				
CD73 TY/23 NT, ecto-5'-nucleotidase	<i>Nt5</i>	69 kDa		NMP		Enzymatic activity				
CD74 In-1 Ia-associated invariant chain (Ii)	<i>Ii</i>	Ia-associated chondroitin sulfate proteoglycan	31, 41 kDa	CD44; MHC class II		Antigen presentation; differentiation/development				
CD79a HM47 Igα, mb-1, Ly-54	<i>Iga</i>	B-cell receptor complex	30-35 kDa			Signal transduction				
CD79b HM79b Igβ, 829	<i>Igb</i>	B-cell receptor complex	35-40 kDa			Signal transduction; differentiation/development				
CD80 16-10A1, 1G10 B7/BB1, B7-1, Ly-53	<i>Cd80</i>	55 kDa	Ig	CD28; CD152		Activation/costimulation; immunoregulation				
CD81 2F7, Eat1, Eat2 TAPA-1	<i>Cd81</i>	CD19/CD21/CD81 complex	26 kDa			Activation/costimulation; adhesion; differentiation/development				
CD82 C33 Ag, KAI1	<i>Kai</i>		TM4			Activation/costimulation				
CD83	<i>Cd83</i>		Ig			Activation/costimulation				
CD84	<i>Cd84</i>		CD2 Ig							
CD86 GL1, PO3 B7-2, B70, Ly-58	<i>Cd86</i>	80 kDa	Ig	CD28; CD152		Activation/costimulation; immunoregulation				
CD87 uPA Receptor	<i>Plaur</i>			uPA		Adhesion; receptor/coreceptor				

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of Molecular Weight Family/Superfamily	Ligands/ Substrates	Antigen Distribution	Functions of Antigens
CD88 C5a Ligand, C5aR	<i>C5r1</i>		C5a		Activation/costimulation; C' regulation
CD90 G7 Thy-1, 0, T25	<i>Thy1</i>	25-30 kDa Ig			Signal transduction; activation/costimulation; adhesion; differentiation/ development
CD90.1 HIS51, OX-7 Thy-1.2, 0-AKR	<i>Thy1^a</i>	25-30 kDa Ig			Signal transduction; activation/costimulation; adhesion; differentiation/ development
CD90.2 S3-2.1, 30-H12 Thy-1.2, 0-C3H	<i>Thy1^b</i>	25-30 kDa Ig			Signal transduction; activation/costimulation; adhesion; differentiation/ development
CD91 LRP, A2MR	<i>Lrp1</i>	600 kDa LDLR	LDL; LRPAP1; α_2 M; apo E; Gp96		Antigen presentation; hemostasis; metabolism
CD94 18d3	<i>Klrd1</i>	CD94/NKG2 heterodimers C-type lectin	Qa-1/Qdm		Antigen recognition; immunoregulation
CD95 Jo2, 13 Fas, APO-1	<i>Tnfrsf6</i>	45 kDa TNFR	CD178		Apoptosis
CD97	<i>Cd97</i>	EGF-TM7	CD55		
CD98 H202-141 4F2, Ly-10, RL-388	<i>Cd98</i>	120 kDa			Activation/costimulation; immunoregulation?
CD100 30 Semaphorin H, coll-4	<i>Sema4d</i>	150 kDa Semaphorin	CD72; Plexin-B1		Immunoregulation
CD102 3C4(mIC2/4) ICAM-2, Ly-60	<i>Icam2</i>	55-68 kDa Ig	LFA-1		Activation/costimulation; adhesion
CD103 2E7, M290 Integrin α_{IEL} chain	<i>Itgae</i>	$\alpha_{IEL}\beta_7$ integrin 150 kDa (and 20 kDa?) Integrin	E-cadherin		Activation/costimulation; adhesion; differentiation/ development
CD104 346-11A Integrin β_4 chain	<i>Itgb4</i>	$\alpha_B\beta_4$ integrin (TSP-180) 205 kDa	Laminin		Adhesion
CD105 MJ7/18 Endoglin	<i>Eng</i>	180 kDa TGFR	TGF- β		Adhesion; receptor/coreceptor

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD106 429 (MVCAM.A) VCAM-1	<i>Vcam1</i>	100-110 kDa; 47 kDa GPI-linked Ig		VLA-4		Adhesion; differentiation/ development
CD107a 1D4B LAMP-1	<i>Lamp1</i>	110-140 kDa Lamp		collagen?; laminin?; fibronectin?		Adhesion?
CD107b ABL-93 LAMP-2	<i>Lamp2</i>	100-110 kDa Lamp				Adhesion?
CD110 Thrombopoietin Receptor, c-mpl	<i>Mpl</i>	CKR				Differentiation/ development
CD111 PRR1, nectin-1	<i>Pvr1</i>	Ig		α-herpesviruses		Adhesion
CD112 PRR2, nectin-2	<i>Pvs</i>	Ig				Adhesion
CD114 G-CSF Receptor	<i>Csf3r</i>	95-125 kDa CKR		G-CSF		Signal transduction; differentiation/ development; receptor/coreceptor
CD115 M-CSF Receptor, CSF-1R, c-fms, Fim-2	<i>Csf1r</i>	165 kDa RTK		M-CSF		Signal transduction; differentiation/ development; receptor/coreceptor
CD116 GM-CSF Receptor α chain	<i>Csf2ra</i>	GM-CSF Receptor CKR		GM-CSF		Signal transduction; differentiation/ development; receptor/coreceptor
CD117 2B8, ACK45 c-kit, Steel factor receptor, Dominant white spotting	<i>Kit</i>	145-150 kDa Ig, RTK		c-Kit Ligand (aka Steel, stem cell, or mast cell growth factor)		Signal transduction; adhesion; differentiation/ development; receptor/coreceptor
CD118 IFN-α/β Receptor, Type 1 IFN-R, IFN-α Receptor	<i>Ifnar</i>	CKR		IFN-α; IFN-β		Immunoregulation?; receptor/coreceptor
CD119 GR20, 2E2 IFN-γ Receptor α chain	<i>Ifngr</i>	IFN-γ Receptor CKR		IFN-γ		Immunoregulation; receptor/coreceptor
CD120a 55R-170, 55R-593, 55R-286 TNFR1, TNF-R55	<i>Tnfrsf1a</i>	55-60 kDa TNFR		TNF; LT-α3 (aka TNF-β)		Signal transduction; apoptosis; receptor/coreceptor
CD120b TR75-32, TR75-54, TR75-89 TNFR2, TNF-R75	<i>Tnfrsf1b</i>	75-80 kDa TNFR		TNF; LT-α3 (aka TNF-β)		Signal transduction; apoptosis; necrosis; receptor/coreceptor

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of			Ligands/ Substrates	Antigen Distribution	Functions of Antigens			
		Molecular Weight		Family/Superfamily						
CD121a 35F5, 12A6, JAMA-147 IL-1 Receptor, Type I	<i>Il1r1</i>	80 kDa	Ig	IL-1 α ; IL-1 β			Signal transduction; activation/costimulation; receptor/coreceptor			
CD121b 1F6, 4E2 IL-1 Receptor, Type II	<i>Il1r2</i>	60 kDa	Ig	IL-1 α ; IL-1 β			Immunoregulation; receptor/coreceptor			
CD122 TM- β 1, 5H4 IL-2 and IL-15 Receptor β chain	<i>Il2rb</i>	IL-2 and IL-15 receptors 85-100 kDa CKR		IL-2; IL-15			Signal transduction; immunoregulation; receptor/coreceptor			
CD123 5B11 IL-3 Receptor α chain	<i>Il3ra</i>	IL-3 receptor 60-70 kDa CKR		IL-3			Differentiation/development?; receptor/coreceptor			
CD124 mIL4R-M1 IL-4 Receptor α chain	<i>Il4ra</i>	IL-4 and IL-13 receptors 138-145 kDa CKR		IL-4; IL-13			Signal transduction; receptor/coreceptor			
CD125 IL-5 Receptor α chain	<i>Il5ra</i>	IL-5 receptor 60 kDa CKR		IL-5			Activation/costimulation; immunoregulation?; receptor/coreceptor			
CD126 D7715A7 IL-6 Receptor α chain	<i>Il6ra</i>	IL-6 receptor 80 kDa CKR, Ig		IL-6			Differentiation/development; immunoregulation; receptor/coreceptor			
CD127 B12-1, SB/14 IL-7 Receptor α chain	<i>Il7r</i>	IL-7 receptor 65-75 kDa CKR		IL-7			Signal transduction; differentiation/development; receptor/coreceptor			
CD128 IL-8 Receptor α chain, CXCR2	<i>Cmkar2</i>	α -chemokine receptor		MIP2; KC; (human IL-8)			Activation/costimulation; receptor/coreceptor			
CD130 gp130, Common β chain	<i>Il6st</i>	IL-11, OSM, CNTF & LIF receptors 130 kDa CKR					Signal transduction			
CD131 J0R050 AIC2A & AIC2B, β_{IL-2} and β_c	<i>Csf2rb1</i> and <i>Csf2rb2</i>	IL-3, IL-5, & GM-CSF receptors 110-120 kDa(AIC2A); 120-140 kDa (AIC2B) CKR		IL-3 (for AIC2A)			Signal transduction; receptor/coreceptor			
CD132 4G3, 3E12, TUGm2 Common γ chain	<i>Il2rg</i>	IL-2, IL-4, IL-7, IL-9 and IL-15 receptors CKR					Signal transduction			
CD133 AC133, Prominin	<i>Prom</i>	5-TM								
CD134 OX-86 Ly-70, OX-40 antigen, ACT35 antigen	<i>Tnfrsf4</i>	50 kDa TNFR		OX-40 Ligand			Activation/costimulation			

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of	Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight			
		Family/Superfamily			
CD135 A2f10.1 Flk-2, Flt3, Ly-72	<i>Flt3</i>	135-150 kDa Ig, RTK	Flt3 Ligand		Differentiation/ development; receptor/coreceptor
CD137 1AH2 (aka 53A2) 4-1BB, Ly-63	<i>Tnfrsf9</i>	30 kDa (monomer); 55 kDa (dimer); or 110 kDa (tetramer) TNFR	4-1BBL; fibronectin; laminin; vitronectin; collagen IV		Antigen presentation; signal transduction; activation/costimulation; adhesion
CD138 2B1-2 Syndecan-1	<i>Sdc1</i>	31-kDa core protein Glycosaminoglycan	interstitial matrix proteins		Adhesion
CD140a APAS PDGF Receptor α chain, PDGFR- α	<i>Pdgfra</i>	PDGF receptor homodimer and heterodimer 180 kDa CKR, RTK	PDGF A chain; PDGF B chain		Signal transduction; differentiation/ development; receptor/coreceptor
CD140b 2B PDGF Receptor β chain, PDGFR- β	<i>Pdgfrb</i>	PDGF receptor homodimer and heterodimer 180 kDa CKR, RTK	PDGF B chain		Signal transduction; differentiation/ development; receptor/coreceptor; chemotaxis
CD141 Thrombomodulin	<i>Thbd</i>	C-type lectin	thrombin		Hemostasis
CD142 Tissue Factor, Coagulation Factor III	<i>F3</i>	Serine protease cofactor	Plasma Factor VII/VIIa		Differentiation/ development?; hemostasis; angiogenesis
CD143 Angiotensin converting enzyme, dipeptidyl peptidase	<i>Ace</i>	Peptidylpeptidase	angiotensin I		Enzymatic activity
CD144 11D4.1 VE-Cadherin	<i>Cdh5</i>	125 kDa Cadherin	CD144		Adhesion; angiogenesis
CD146	<i>Mcam</i>	Ig			Adhesion
CD147 Basigin, HT7, neurothelin, gp42	<i>Bsg</i>	Ig			Adhesion
CD148 PTP β 2, ByP	<i>Ptpj</i>	FNIII, PTP			Signal transduction
CD150 IPO-3	<i>Slam</i>	Ig			Signal transduction
CD151 SFA-1, PETA-3	<i>Cd151</i>	TM4			Hemostasis?

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD152 9H10, UC10-4F10-11 CTLA-4, Ly-56	<i>Cd152</i>	33-37 kDa Ig		CD80; CD86		Immunoregulation
CD153 RM153 CD30 Ligand	<i>Tnfsf8</i>	40 kDa TNF		CD30		Activation/costimulation; immunoregulation
CD154 MR1 gp39, CD40 Ligand, Ly-62	<i>Tnfsf5</i>	39 kDa TNF		CD40		Activation/costimulation
CD156a MS2, ADAM 8	<i>Adam8</i>	89 kDa Metalloproteinase				Adhesion; enzymatic activity
CD156q TACE, ADAM17	<i>Adam17</i>	130 kDa Metalloproteinase		TNF- α ; APP; CD62L		Adhesion; enzymatic activity; receptor/coreceptor
CD157 Ly-65, BP-3, BST-1	<i>Bst1</i>	38-48 kDa ADP-ribosylcyclase				Adhesion?
CD159a 20d5 NKG2A, NKG2B	<i>Klrc1</i>	CD94/NKG2 heterodimers 38 kDa C-type lectin		Qa-1/Qdm		Antigen recognition; signal transduction
CD160 BY55	<i>Cd160</i>		Ig			
CD161a NKR-P1A	<i>Ly55a</i>					
CD161b PK136 NKR-P1B	<i>Ly55b</i>		81 kDa C-type lectin			
CD161c PK136 NKR-P1C, NK-1.1, Ly-55	<i>Ly55c</i>		76-80 kDa C-type lectin			Activation/costimulation
CD162 2PH1 P-selectin-IgG fusion protein P-selectin glycoprotein Ligand (PSGL-1)	<i>Selp1</i>		160 kDa Sialomucin	CD62P		Adhesion
CD163	<i>Cd163</i>		SRCR			
CD164 MGC-24, A115, A24	<i>Cd164</i>					Adhesion
CD166 ALCAM, DM-GRASP	<i>Alcam</i>	120 kDa Ig		CD6		Activation/costimulation; adhesion; differentiation/ development?

Table 3.1 Mouse CD antigen chart (*continued*)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD167a Cak, Nep	<i>Ddr1</i>		RTK			Adhesion
CD168 RHAMM	<i>Hmmr</i>					Adhesion
CD169 Sialoadhesin, Siglec-1	<i>Sn</i>		Siglec	CD43; CD162		Adhesion
CD170 Siglec-5	<i>Siglec5</i>		Siglec			Adhesion
CD171 17 L1	<i>L1cam</i>					Adhesion
CD172a P84 SIRP α , SHPS-1, BIT, P84 Antigen	<i>Ptpns1</i>	77, 86 kDa	Ig	CD47		Signal transduction; adhesion
CD178 MFL3, MFL4, 33 CD95L, Fas Ligand	<i>Tnfsf6</i>		TNF	CD95		Signal transduction; activation/costimulation; differentiation/development; apoptosis; cytotoxicity?
CD178.1 Kay-10 mFasL.1	<i>Tnfsf6</i>		TNF	CD95		Signal transduction; activation/costimulation; differentiation/development; apoptosis; cytotoxicity?
CD179a VpreB	<i>Vpreb1</i>	Pre-B cell receptor	16 kDa			Differentiation/ development
CD179b LM34 λ 5	<i>Vpreb2</i>	Pre-B cell receptor	22 kDa			Differentiation/ development
CD180 RP14 RP105	<i>Ly78</i>	RP105/MD-1 complex	105 kDa			Signal transduction
CD183 CXCR3	<i>Cmkar3</i>		Chemokine receptor	IP-10; 6Ckine; Mig; I-TAC		Receptor/coreceptor; chemotaxis
CD184 2B11/CXCR4 CXCR4	<i>Cmkar4</i>		Chemokine receptor	SDF-1		Receptor/coreceptor; chemotaxis
CD195 C34-3448 CCRS	<i>Cmkbr5</i>		Chemokine receptor	MIP-1 α ; MIP-1 β ; RANTES; MCP-1		Receptor/coreceptor; chemotaxis
CD197 CCR7	<i>Cmkbr7</i>		Chemokine receptor	SLC		Receptor/coreceptor; chemotaxis

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD200 OX-90 OX-2 Ag	<i>Mox2</i>		Ig	CD200 receptor		Immunoregulation
CD201 CCD41, EPCR, Protein C Receptor	<i>Procr</i>		CD1/MHC	Protein C		Receptor/coreceptor; hemostasis
CD202 33 Endothelial-specific receptor tyrosine kinase, Tie2	<i>Tek</i>		RTK			Differentiation/development
CD203c Ly-41, PC-1	<i>Enpp1</i>	220 kDa	E-NPP	Extracellular nucleotides		Enzymatic activity
CD204 Macrophage scavenger receptor	<i>Scvr</i>		Class A scavenger receptor	LPS; collagen; LDL?		Adhesion
CD205 DEC-205, Ly-75	<i>Ly75</i>	205 kDa	C-type lectin			Antigen presentation
CD206 Macrophage mannose receptor	<i>Mrc1</i>	175 kDa	C-type lectin	High-mannose carbohydrates		Antigen presentation
CD210 1B1.3a IL-10 receptor, CRF2-4	<i>Il10ra, Il10rb</i>		CKR	IL-10		Immunoregulation; receptor/coreceptor
CD212 114 IL-12R β chain	<i>Il12rb1</i>	IL-12 receptor	CKR	IL-12		Immunoregulation; receptor/coreceptor
CD213a1 NR4, IL-13R α1 chain	<i>Il13ra1</i>	IL-13 and IL-4 receptors	CKR	IL-13		Immunoregulation; receptor/coreceptor
CD213a2 IL-13R α2 chain	<i>Il13ra2</i>	IL-13 receptor	CKR	IL-13		Immunoregulation; receptor/coreceptor
CD217 IL-17R	<i>Il17r</i>			IL-17; vIL-17		Immunoregulation; receptor/coreceptor
CD220 4G, Polyclonal Insulin receptor	<i>Insr</i>	130 kDa, 95 kDa	RTK	Insulin		Receptor/coreceptor; metabolism
CD221 IGF-IR	<i>Igf1r</i>		RTK	IGF-I; Insulin		Receptor/coreceptor; metabolism
CD222 IGF-II-R, CI-MP R	<i>Igf2r</i>	220-250 kDa	RTK	IGF-II; mannose-6-phosphate residues; retinoic acid; TGF-β LAP		Receptor/coreceptor; metabolism

Table 3.1 Mouse CD antigen chart (continued)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of		Ligands/ Substrates	Antigen Distribution	Functions of Antigens
		Molecular Weight	Family/Superfamily			
CD223 C9B7W Ly-66, LAG3	<i>Lag3</i>		Ig	MHC class II		Immunoregulation
CD224 γ -glutamyl transpeptidase	<i>Ggtp</i>			glutathione		Enzymatic activity
CD227 EMA	<i>Muc1</i>					
CD228 MTf, p97	<i>Mfi2</i>					
CD229 Lgp100, T100, Ly-9	<i>Ly9</i>	100 kDa, 150 kDa	CD2 Ig			
CD229.1 30C7 Lgp100, Ly-9.1	<i>Ly9^a</i>	100 kDa	CD2 Ig			
CD230 Prion protein	<i>prnp</i>					Differentiation/ development
CD231 TALLA, A15	<i>Tm4sf2</i>		TM4			
CD232 Plexin C1, Vespr	<i>plxnc1</i>		Plexin			
CD233 AE1, band 3	<i>slc4a1</i>		SLC			Metabolism
CD234 Duffy blood group, DARC	<i>Dfy</i>			Chemokines		Receptor/coreceptor; chemotaxis
CD235a Glycophorin A	<i>Gypa</i>					
CD236R Glycophorin C	<i>Gyc</i>					
CD238 Kell blood group, endo- thelin-3-converting enzyme	<i>Kel</i>	Keil/Kx antigen complex 110 kDa Neutral endopeptidase	big ET3			Enzymatic activity
CD239 Lutheran blood group	<i>Lu</i>		Ig	Laminin 10/11		Adhesion

Table 3.1 Mouse CD antigen chart (*continued*)

Antigen clones offered by BD Biosciences alternate names of antigen	Gene	Component of Molecular Weight Family/Superfamily	Ligands/ Substrates	Antigen Distribution	Functions of Antigens
CD240 Rh30, Rh antigen	<i>Rhced</i>	Rh blood group Rh			Metabolism
CD241 Rh50, Rh-associated glycoprotein	<i>Rhag</i>	Rh blood group 50 kDa Rh			Metabolism
CD243 P-glycoprotein1, Mdr1	<i>Abcb1</i>		Drugs, dyes		Enzymatic activity; metabolism
CD244.2 2B4 2B4 Antigen	<i>Nmrk^b</i>		CD48		Signal transduction
CD246 Anaplastic lymphoma kinase	<i>alk</i>		Unknown		Enzymatic activity
CD247 1 ζ 3A1, 1 η 4F2, 8d3 CD3z, CD3 ζ chain	<i>Cd3z</i>	T-cell receptor 16, 21, 32, 42 kDa			Signal transduction

Table 3.2 Alternate names of mouse leukocyte antigens

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
2B4 antigen	CD244
4-1BB	CD137
4F2	CD98
5E6	Ly-49C and Ly-49I
6C3 antigen	Ly-51
A1	Ly-49A
ACT35 antigen	CD134
AIC2A and AIC2B	CD131
Aminopeptidase N	CD13
APO-1	CD95
APO-2 ligand	TRAIL
B220	CD45R/B220
B29	CD79b
B7-1, B7/BB1	CD80
B7-2, B70	CD86
BCM1	CD48
β_{IL-2} and β_c	CD131
BIT	CD172a
BP-1 antigen	Ly-51
BP-3	CD157
BST-1	CD157
c-Kit	CD117
ClqRp	Early B lineage
C3b receptor	CD35
CALLA	CD10
CCR5	CD195
CD1.1	CD1d
CD3 ϵ chain	CD3 ϵ
CD3 ζ chain	CD247
CD21b	CD35
CD27 ligand	CD70

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
CD30 ligand	CD153
CD40 ligand	CD154
CD62L ligand	PNAd
CD95 ligand	CD178
CD161	NK-1.1
coll-4	CD100
Common γ chain	CD132
CR1	CD35
CR2/CR1	CD21/CD35
CRF2-4	CD210
CTLA-4	CD152
CXCR4	CD184
DDP IV	CD26
DX5	CD49b
E-selectin	CD62E
Ecto-5'-nucleotidase	CD73
ELAM-1	CD62E
endoCAM	CD31
Endoglin	CD105
Erythroid cells	TER-119
Fas	CD95
Fas ligand	CD178
Fc ϵ RII	CD23
Fc γ III/II receptor	CD16/CD32
Fibronectin receptor α chain	CD49e
Fibronectin receptor β chain	CD29
Flk-2	CD135
Flt3	CD135
γ_c	CD132
GL7	T and B cell activation antigen
GMP-140	CD62P

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
gp150	CD13
gp39	CD154
gp39 receptor	CD40
gplla	CD29
gpllb	CD41
gpllla	CD61
Gr-1	Ly-6G and Ly-6C
H2-DM	HZ-M
H4	ICOS
Heat stable antigen	CD24
HsAg, HSA	CD24
Ia-associated invariant chain	CD74
IAP	CD47
ICAM-1	CD54
ICAM-2	CD102
IFN- γ receptor α chain	CD119
Ig α	CD79a
Ig β	CD79b
IgE Fc receptor	CD23
II	CD74
IL-1 receptor type I/p80	CD121a
Il-1 receptor type II/p60	CD121b
IL-2 receptor α chain	CD25
IL-2 and IL-15 receptor β chain	CD122
IL-3 receptor α chain	CD123
IL-4 receptor α chain	CD124
IL-6 receptor α chain	CD126
IL-7 receptor α chain	CD127
IL-10 receptor	CD210
IL-12 receptor β chain	CD212
Insulin receptor	CD220
Integrin α_1 chain	CD49a

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
Integrin α_2 chain	CD49b
Integrin α_3 chain	CD49c
Integrin $\alpha_4 \beta_7$ complex	LPAM-1
Integrin α_4 chain	CD49d
Integrin α_5 chain	CD49e
Integrin α_6 chain	CD49f
Integrin $\alpha_{1E\bar{L}}$ chain	CD103
Integrin α_{1b} chain	CD41
Integrin α_L chain	CD11a
Integrin α_M chain	CD11b
Integrin α_V chain	CD51
Integrin α_X chain	CD11c
Integrin β_1 chain	CD29
Integrin β_2 chain	CD18
Integrin β_3 chain	CD61
Integrin β_4 chain	CD104
Integrin-associated protein	CD47
Ki-1	CD30
L-selectin	CD62L
L1	CD171
L3T4	CD4
LAG3	CD223
λ 5	CD179b
Laminin receptor α chain	CD49f
Laminin receptor β chain	CD29
LAMP-1	CD107a
LAMP-2	CD107b
LCA	CD45
LECAM-1	CD62L
Leukocyte common antigen	CD45
Leukosialin	CD43

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
LFA-1 α chain	CD11a
LFA-1 β chain	CD18
LFA-2	CD2
LGL-1	Ly-49G2
Lgp-100	CD299.1
LPAM-1 α chain	CD49d
LPAM-1 β chain	Integrin β_7 chain
LPAM-2 α chain	CD49d
LPAM-2 β chain	CD29
Ly-1	CD5
Ly-2	CD8a
Ly-3	CD8b
Ly-4	CD4
Ly-5	CD45
Ly-6E	TSA-1
Ly-9.1	CD229.1
Ly-10	CD98
Ly-12	CD5
Ly-15	CD11a
Ly-17	CD16/CD32
Ly-19	CD72
Ly-21	CD11a
Ly-22	CD62L
Ly-24	CD44
Ly-32	CD72
Ly-35	CD8a
Ly-37	CD2
Ly-38	CD1d
Ly-40	CD11b
Ly-42	CD23
Ly-43	CD25
Ly-44	CD20

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
Ly-47	CD54
Ly-48	CD43
Ly-52	CD24
Ly-53	CD80
Ly-54	CD79a
Ly-55	NK1.1
Ly-56	CD152
Ly-58	CD86
Ly-59	NK1.1
Ly-60	CD102
Ly-61	Ly-6D
Ly-62	CD154
Ly-63	CD137
Ly-63L	4-1BB ligand
Ly-65	CD157
Ly-66	CD223
Ly-67	TSA-1
Ly-68	Early B lineage
Ly-69	Integrin β_7 chain
Ly-70	CD134
Ly-70L	OX-40 ligand
Ly-72	CD135
Ly-73	Flk1
Ly-74	Ep-CAM
Ly-76	TER-119
Ly-77	T and B cell activation antigen
Ly-78	CD180
Ly-79	Dendritic cells
Ly-81	TRAIL
Ly-89	PIR-A/B
Ly-90	CD244

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
Ly-92a	ART2.2
Ly-101	PD-1
Ly-115	ICOS
Ly-A	CD5
Ly-B	CD8a
Ly-C	CD8b
Ly-m10	CD98
Ly-m11	β_2 microglobulin
Ly-m19	CD72
Ly-m22	CD62L
Lyam-1	CD62L
Lyb-2	CD72
Lyb-8.2	CD22.2
LyM-1	CD16/CD32
Lym-20	CD16/CD32
Lyt-1	CD5
Lyt-2	CD8a
Lyt-3	CD8b
Mac-1 α chain	CD11b
Mac-1 β chain	CD18
MAFA	KLRG1
MALA-2	CD54
Mast cell factor receptor	CD117
mb-1	CD79a
MECA-32 antigen	Panendothelial cell antigen
Mo2	CD14
Mucosialin	CD34
N-CAM	CD56
Nectadrin	CD24
NKR-P1B	NK-1.1
NKR-P1C	NK-1.1
NT	CD73

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
OX-2 antigen	CD200
OX-40 antigen/receptor	CD134
P-selectin	CD62P
P-selectin glycoprotein ligand	CD162
p150, 95 α chain	CD11c
p150, 95 β chain	CD18
p24	CD9
p55	CD25
P84 antigen	CD172a
PADGEM	CD62P
Pan-NK cells	CD49b
PDGF receptor α chain	CD140a
PDGF receptor β chain	CD140b
PECAM-1	CD31
pglla	CD31
Pgp-1	CD44
Pre-BCR	Pre-B cell receptor
PSGL-1	CD162
pT α	Pre-T cell receptor α chain
RL-388	CD98
RP105	CD180
Rt6-2	ART2.2
Sca-1	Ly-6A/E
Sca-2	TSA-1
Scavenger receptor	CD36
Semaphorin H	CD100
Siglec-2	CD22
sgp-60	CD48
SHPS-1	CD172a
Sialophorin	CD43
SIRP α	CD172a

Table 3.2 Alternate names of mouse leukocyte antigens (*continued*)

Common names for mouse leukocyte antigens	Specificity in mouse leukocyte catalog section
Steel factor receptor	CD117
Stem cell factor receptor	CD117
Syndecan-1	CD138
θ	CD90
T3	CD3
T10	CD38
T200	CD45
TAP	Ly-6A/E
TAPA-1	CD81
THAM	CD26
ThB	Ly-6D
Thy-1	CD90
Thy-1.1	CD90.1
Thy-1.2	CD90.2
TNFR receptor type I/p55	CD120a
TNF receptor type II/p75	CD120b
Transferin receptor	CD71
TSP-180 α chain	CD49f
TSP-180 β chain	CD104
VCAM-1	CD106
VE-cadherin	CD144
VEGF-R2	Flk1
Very Early Activation antigen	CD69
Vitronectin receptor α chain	CD51
Vitronectin receptor β chain	CD61
VLA-1 α chain	CD49a
VLA-2 α chain	CD49b
VLA-3 α chain	CD49c
VLA-4 α chain	CD49d
VLA-5 α chain	CD49e
VLA-6 α chain	CD49f
VLAβ	CD29

Table 3.3 Mouse cell surface antigens: Non-CD antigens

Non-CD antigens by alphanumeric order						
Antigen	Other names	MW	Structure	Chromosome #	Expression	Function
4-1BBL	Tnfsf9 TNFSF			17	B ^{act} , DC ^{act} , peritoneal mac ^{act}	DC activation, cytokine production
B7-H1	PD-L1				Broad	Cell costimulation, receptor for PD-1
B7-H2	GL50, ICOS-L, B7h, B7RP-1				B, DC, mono	Cell costimulation, receptor for ICOS
B7-DC	PD-L2				Mono, mac, DC subset	Cell costimulation, receptor for PD-1
BP-1	Ly-51, 6C3, Enpep	120–160 kD	Type II TM	3	Early B progenitors, BM stromal cells, thymic epith	Zinc metalloproteinase, glutamyl aminopeptidase
DX5	VLA-2, Integrin α 2, Itga 2	165 kD	IntgF	13	NK, T subset	
Flk-1	Kdr, Ly73, VEGFR2		RTK family	5	Endoth	Receptor for VEGF
Flt-4	VEGFR3	170 kD	RTK family	11	Lymphatic endoth	Endoth growth factor receptor, binds VEGF-C
ICOS	Ly115	26 kD	IgSF	1	Thymic medulla, geminal center T cells, T ^{act}	Inducible T cell Costimulator, T costimulation, B7-H2 receptor, cytokine production, B help
IgE high affinity receptor					B, mono	High affinity binding to IgE
IgM					Surface expression by mature B cells	
Jagged-1						Receptor for Notch-1
Ly-6A/E	Sca-1	18 kD	GPI-linked		Gran, mono, B, T subset, endoth	T activation
Ly-6B						
Ly-6C		14–17 kD	GPI-linked		Endoth, T, NK, mono, mac	
Ly-6D	ThB, Ly-61	15 kD	GPI-linked		B, T, thymic epith	
Ly-6F						
Ly-6G	Gr-1	21–25 kD	GPI-linked	Unknown	Myeloid cells	

Table 3.3 Mouse cell surface antigens: Non-CD antigens (*continued*)

Non-CD antigens by alphanumeric order						
Antigen	Other names	MW	Structure	Chromosome #	Expression	Function
Ly-49A	A1, Klra1	85 kD	Type II TM C-type lectin	6	T subset, NK subset	Regulation of cytotoxicity, binds MHC class I
Ly-49B	Klra2			6		
Ly-49C	Klra3, 5E6	110 kD	Type II TM C-type lectin	6	T subset, NK subset	Regulation of cytotoxicity, binds MCH class I
Ly-49D	Klra4		Type II TM C-type lectin	6	NK subset	NK activation
Ly-49E	Klra5			6		
Ly-49F	Klra6			6		
Ly-49G	LGL1, Klra7	85 kD	Type II TM C-type lectin	6	T subset, NK subset	Regulation of cytotoxicity
Ly-49H	Klra8		Type II TM C-type lectin	6		
Ly-49I	Klra9		Type II TM C-type lectin	6		
Mac-3		93–110 kD			Mac (surface and intercellular) related to CD107b	
MAd-CAM-1		50 kD	IgSF, Type I TM	10	Endoth subset	Mucosal vascular addressin cell adhesion molecule, adhesion, cells homing, binds CD49d and CD62L
Notch-1	Lin-12, Tan1			2	Developing embryo, variety of adult tissues	Cell-cell interaction, cell fate determination
OX-40 ligand	Tnfsf4, gp34	35 kD	TNFSF	1	B ^{act} , cardiac myocytes	T-B interaction, T costimulation
PD-1	Programmed death-1	55 kD			Thymocyte subset, T ^{act} , B ^{act}	T-B interaction, T costimulation, peripheral tolerance
Sca-1	Sca-1	18 kD	GPI-linked		Gran, mono B, T subset, endoth	T activation
Ter-119	Ly-76				Early proerythroblast to mature erythrocyte	W/ glycophorin, but not a typical glycophorin

Table 3.3 Mouse cell surface antigens: Non-CD antigens (*continued*)

Non-CD antigens by alphanumeric order						
Antigen	Other names	MW	Structure	Chromosome #	Expression	Function
Tie2	Tek	140 kD	RTK family	4	Stem cells, endoth from early development	Angiogenesis, Angiopoietin-1 receptor
TLR1				5		Activation of AP-1 not NF- κ B
TLR2				3 or 8	Mono, mac, adipocytes, $\gamma\delta$ T	Response to bacterial lipoproteins
TLR3				3 or 8		Binds double stranded RNA, activation of NK- κ B
TLR4	Ly87, Rasl2-8			4	Peritoneal mac	Bacterial lipoproteins response, NF- κ B and AP-1 activation
TLR5				1	mRNA: liver, lung, lower level in MOLF/Ei mice	Role in Gram-negative bacterial infection
TLR6				5	mRNA: spleen, thymus, ovary, lung	Activation of NF- κ B and JunK
TLR7				X		
TLR8				X		
TLR9				6		CpG DNA receptor, TLR9KO resist lethal effect of CpG
TRAIL	Ly-81, APO-2L, Tnfsf10 TNFSF			Unknown	NK ^{act} , liver NK	Apoptosis
TCR	$\alpha\beta$				T subset	Antigen recognition
TCR	$\gamma\delta$				T subset	Antigen recognition
TCR-Hy					Transgenic H-Y T cells	

Abbreviations:

Act	Activated	KO	Knock-out mouse
Ag	Antigen	LRRF	Leucine-rich repeat family
BM	Bone marrow	Mac	Macrophages
CCRSF	Complement component receptor superfamily	MHC	Major histocompatibility complex
CHO	Carbohydrate moiety	Mono	Monocytes
CRSF	Cytokine receptor superfamily	NK	Natural killer
DC	Dendritic cells	RTK	Receptor tyrosine kinase
ECM	Extracellular matrix	SRCRSF	Scavenger receptor cysteine-rich superfamily
Endoth	Endothelial cells	TM	Transmembrane
Epith	Epithelial cells	TM12SF	12-transmembrane spanning protein superfamily
FDC	Follicular dendritic cells	TM4SF	4-transmembrane spanning protein superfamily
GPI	Glycophosphatidylinositol	TM7SF	7-transmembrane spanning protein superfamily
Gran	Granulocytes	TNFRSF	TNF receptor superfamily
(H)	Human CD, not defined in mouse	TNFSF	TNF superfamily
IgSF	Immunoglobulin superfamily	TLRSF	Toll-like receptor superfamily
IntgF	Integrin family	W/	Associates with

Table 3.4 Mouse leukocyte antigen distribution chart

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
CD23 (FCεRII)	ND	Sub/Act	Sub/ Act	Unkn	Most	Sub	Most	Unkn	Unkn
CD24 (heat stable antigen)	Most/ Dev	Most/ Dev	Sub	ND	Most/ Dev	Most	Unkn	Most	Unkn
CD25 (IL-2 receptor α chain, p55)	Most/ Act+Dev	Most/ Act+Dev	Sub/ Dev	ND	Most/ Dev	Unkn	Unkn	Unkn	Unkn
CD26 (THAM, DPP IV)	Most/Act	Most	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD27	Most	Sub	Unkn	Sub	ND	ND	Unkn	Unkn	Unkn
CD28	Most/ Act+Dev	ND	Unkn	Most	Unkn	Unkn	Unkn	Unkn	Unkn
CD29 (integrin β ₁ chain)	Most	Most	Most	Most	Most	Most	Most	ND	Most
CD30	Most/Act	Most/ Act	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD31 (PECAM-1)	Sub	Sub	Most	Most/ Act	Sub	Most	Most	Unkn	Most
CD34	ND	ND	ND	ND	ND	ND	ND	ND	Sub
CD35 (CR1, CD21b)	ND	Most	Sub	Unkn	Most	Most/ Act	ND	ND	Unkn
CD36 (scavenger receptor)	Unkn	Most/ Dev	Unkn	Unkn	Most/ Dev	Unkn	Unkn	Unkn	Sub
CD38	Sub	Sub	Unkn	Most	Sub	Unkn	Unkn	ND	Unkn
CD40	Sub	Most	Sub	Unkn	Most/ Act	Unkn	Unkn	Unkn	Unkn
CD41 (integrin α _{IIb} chain)	ND	ND	Unkn	Unkn	Sub	Sub	Most	ND	Unkn
CD43 (Ly-48, leukosialin)	Most	Most/ Dev	Unkn	Most	Most	Most	Most	Unkn	Unkn
CD43 activation-associated glycoform	Most/Act	Most/ Dev	Unkn	Unkn	Most	Most	Unkn	Unkn	Unkn
CD44 (Pgp-1, Ly-24)	Most/ Act+Dev	Most/ Act	Most	Most	Most	Most	Most	Unkn	Unkn
CD45 (leukocyte common antigen, Ly-5)	Most	Most	Most	Most	Most	Most	Most	Most/ Dev	ND
CD45R/B220	Sub/Act	Most/ Dev	Unkn	Sub/ Act+Dev	Sub	ND	ND	ND	ND

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
CD45RA	Sub	Most	ND	Unkn	Unkn	Unkn	Unkn	Unkn	ND
CD45RB	Sub/Dev	Most	Sub	Unkn	Sub	Unkn	Unkn	Unkn	ND
CD45RC	Sub	Most	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	ND
CD47 (IAP)	Most	Most	Most	Most	Most	Most	Most	Most	Most
CD48 (BCM1)	Most	Most	Unkn	Most	Most	Most	Unkn	ND	ND
CD49a (integrin α_1 chain)	Most/Act	ND	Unkn	Unkn	ND	Unkn	Unkn	ND	Sub
CD49b (integrin α_2 chain)	Most/Act	ND	Unkn	Sub	Unkn	Unkn	Most/ Dev	ND	Sub
CD49c (integrin α_3 chain)	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	ND	Unkn
CD49d (integrin α_4 chain)	Most	Most	Unkn	Unkn	Most	Unkn	Unkn	ND	Unkn
CD49e (integrin α_5 chain)	Sub/ Act+Dev	ND	Unkn	Unkn	Sub	Sub	Unkn	ND	Unkn
CD49f (integrin α_6 chain)	Sub	Sub	Unkn	Unkn	Sub	Unkn	Most	ND	Sub
CD51 (integrin α_v chain)	Sub/Act	ND	Unkn	Unkn	Sub	Sub	Most/ Dev	ND	Unkn
CD53	Most/ Dev	Most	Most	Most	Most	Most	Unkn	ND	Unkn
CD54 (ICAM-1)	Sub/Act	Most/ Act	Most/ Act	Unkn	Most/ Act	Most/ Act	Unkn	ND	Most/ Act
CD56 (N-CAM)	ND	ND	Unkn	ND	Unkn	Unkn	Unkn	Unkn	Unkn
CD61 (integrin β_3 chain)	ND	ND	Unkn	ND	Unkn	Sub	Most	ND	Most
CD62E (E-selectin, ELAM-1)	ND	ND	Unkn	ND	ND	ND	Unkn	Unkn	Most/ Act
CD62L (L-selectin)	Most/ Act+Dev	Most/ Act+Dev	Unkn	Sub	Most	Most/ Act	Unkn	Unkn	Unkn
CD62P (P-selectin)	ND	ND	Unkn	ND	ND	ND	Most/ Act	Unkn	Most/ Act
CD69 (Very Early Activation antigen)	Most/ Act+Dev	Most/ Act	Unkn	Most/ Act	Unkn	Most/ Act	Unkn	Unkn	Unkn
CD70	Most/Act	Most/ Act	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD71 (transferrin receptor)	Most/Act	Most/ Act	Unkn	Most/ Act	Most/ Dev	Most/ Dev	Unkn	Most/ Dev	Unkn

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
CD72a alloantigen (Lyb2.1)	ND	Most/ Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD72b alloantigen (Lyb-2.2)	Sub/Act	Most/ Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD72c alloantigen (Lyb-2.3)	ND	Most	Unkn	ND	ND	Unkn	Unkn	Unkn	Unkn
CD73 (Ecto-5'-nucleotidase)	Sub/Dev	Sub/Dev	ND	Unkn	Most/ Dev	Most/ Dev	Unkn	ND	Sub
CD74 (li)	ND	Most	Most	Unkn	Most/ Act	ND	ND	ND	ND
CD79a (Ig α , mb-1)	ND	Most/ Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD79b (Ig β)	ND	Most/ Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD80 (B7-1)	ND	Sub/Act	Most	Unkn	Most	Unkn	Unkn	Unkn	Unkn
CD81 (TAPA-1)	Most/ Dev	Sub/Dev	Most	Unkn	Unkn	Unkn	Unkn	Unkn	Most
CD86 (B7-2)	Sub/Act	Sub/Act	Most/ Act	Unkn	Most/ Act	Unkn	Unkn	Unkn	Unkn
CD90 (Thy-1)	Most	ND	Sub	Most	Sub	ND	ND	ND	Unkn
CD94	Sub	ND	Unkn	Most	ND	ND	Unkn	ND	Unkn
CD95 (Fas)	Most/ Dev	Sub/Act	Sub/ Act	Unkn	Sub	Sub	Sub	Sub	Unkn
CD98 (4F2)	Most/Act	Most/ Act	Unkn	Unkn	Most/ Dev	Most/ Dev	Unkn	Most/ Dev	Unk
CD100	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD102 (ICAM-2)	Most	Most	Sub	Unkn	Unkn	Unkn	Most	Unkn	Most
CD103 (integrin α_{IEL} chain)	Sub/Dev	ND	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	ND
CD104 (integrin β_4 chain)	Sub/Dev	ND	Unkn	ND	ND	ND	Unkn	ND	Sub
CD105 (endoglin)	ND	ND	ND	ND	ND	ND	ND	ND	Most
CD106 (VCAM-1)	ND	ND	Sub	ND	Sub	ND	Unkn	ND	Most/ Act
CD107a (LAMP-1)	Most/Act	Most/ Act	Unkn	Unkn	Most/ Dev	Most/ Dev	Unkn	ND	Most

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
CD154 (CD40 ligand, gp39)	Sub/Act	ND	Unkn	Sub/Act	Unkn	Unkn	Unkn	Unkn	Unkn
CD157 (BP-3 alloantigen)	Sub/Dev	Sub/Dev	Unkn	Unkn	Most/ Dev	Most/ Dev	Unkn	Unkn	Unkn
CD162 (PSGL-1)	Sub	Unkn	Unkn	Unkn	Unkn	Sub	Unkn	Unkn	Unkn
CD171 (L1)	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD172a (SIRP α , SHPS-1)	Unkn	Unkn	Unkn	Unkn	Sub	Unkn	Unkn	Unkn	Unkn
CD178 (Fas ligand, CD95 ligand)	Most/Act	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD179b (λ_5)	ND	Most/ Dev	ND	ND	ND	ND	ND	ND	ND
CD180 (RP105)	ND	Most/ Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD184 (CXCR4)	Most	Most/ Act	Unkn	Unkn	Most	Most	Most	Unkn	Unkn
CD195 (CCR5)	Sub/Act	Unkn	Unkn	Most	Most/ Act	Unkn	Unkn	Unkn	Unkn
CD200 (OX-2 antigen)	Sub	Most	Sub	ND	ND	ND	Unkn	ND	Sub
CD210 (IL-10 receptor)	Sub	Most	Unkn	Unkn	Sub	Unkn	Unkn	Unkn	Unkn
CD212 (IL-12 receptor β chain)	Sub	Sub	Sub	Most	Sub	Unkn	Unkn	Unkn	Unkn
CD220 (insulin receptor)	Unkn	Sub/Dev	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
CD223 (LAG3)	Most/Act	Unkn	Unkn	Most/ Act	Unkn	Unkn	Unkn	Unkn	Unkn
CD229.1 (Ly-9.1)	Most	Most	Unkn	Unkn	Sub	Sub	Sub	Sub	Unkn
CD244.1 (2B4 BALB alloantigen)	Sub/Act	Sub	ND	Most	ND	ND	ND	ND	ND
CD244.2 (2B4 B6 alloantigen)	Sub/Act	ND	ND	Most	ND	ND	ND	ND	ND
CD247 (CD3 ζ chain)	Most	ND	ND	Sub	ND	ND	ND	ND	ND
3G11 (disialoganglioside antigen)	Sub/Act/ Dev	ND	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
4-1BB ligand	ND	Sub/Act	Sub	Unkn	Sub/ Act	Unkn	Unkn	Unkn	Unkn
ART2.2 (Rt6-2)	Most/ Dev+Act	ND	Unkn	Sub	ND	ND	Unkn	Unkn	Unkn

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
KLRG1 (MAFA)	Sub	ND	Unkn	Sub	Unkn	ND	Unkn	Unkn	Unkn
LPAM-1 (integrin $\alpha_4\beta_7$ complex)	Most/ Dev	Most/ Dev	Unkn	Unkn	Most	Unkn	Unkn	Unkn	Unkn
Ly-6A/E (Sca-1)	Sub/Dev	Sub	Unkn	Unkn	Most	Most	Unkn	Unkn	Sub
Ly-6C	Sub/ Act+Dev	Sub/Act	Unkn	Sub	Sub	Unkn	Unkn	Unkn	Most
Ly-6D (ThB)	Most/ Dev	Most	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
Ly-6G	ND	ND	Unkn	ND	Most/ Dev	Most/ Dev	Unkn	ND	Unkn
Ly-49	Sub/Act	ND	Unkn	Sub	Unkn	Unkn	Unkn	Unkn	Unkn
Ly-51 (6C3/BP-1 antigen)	ND	Most/ Dev	Unkn	ND	ND	ND	Unkn	ND	Unkn
Mac-3	ND	ND	Unkn	Unkn	Sub/ Dev	Unkn	Unkn	Unkn	Unkn
MAdCAM-1	ND	ND	Unkn	Unkn	ND	ND	Unkn	ND	Sub
NKCells/3A4	ND	ND	ND	Most	ND	ND	ND	ND	ND
NK-1:1 (NKR-P1B and NKR-P1C)	Sub	ND	ND	Most	ND	ND	ND	ND	ND
NK-T/NK cell antigen	Sub	ND	Unkn	Sub	Unkn	ND	Unkn	ND	Unkn
NKG2A/C/E	Sub	ND	Unkn	Sub	Unkn	Unkn	Unkn	Unkn	Unkn
Notch 1	Sub/Dev	ND	Unkn	ND	ND	ND	Unkn	ND	Unkn
OX-40 ligand	ND	Most/ Act	Sub	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
Panendothelial cell antigen	ND	ND	Unkn	Unkn	ND	ND	Unkn	ND	Most
PD-1	Sub/ Dev+Act	Sub/ Dev+Act	Unkn	Unkn	Sub/ Act	Sub/ Act	Unkn	ND	Unkn
PIR-A/B	ND	Most	Sub	ND	Most	Most/ Dev	Unkn	Unkn	Unkn
PNAd carbohydrate epitope (CD62L ligand)	ND	ND	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Sub/ Act
Pre-B cell receptor (Pre-BCR)	ND	Sub/Dev	Unkn	ND	ND	ND	Unkn	ND	Unkn
Pre-T cell receptor α chain (pT α)	ND	Sub/Dev	Unkn	ND	ND	ND	Unkn	ND	Unkn
Qa-1 ^b	Most/Act	Most/ Act	Unkn	Unkn	Most	Most	Unkn	Unkn	Unkn

Table 3.4 Mouse leukocyte antigen distribution chart (*continued*)

Antigen	T cell	B cell	Dendritic cell	NK cell	Monocyte	Granulocyte	Megakaryocyte	Erythrocyte	Endothelial cell
Qa-2	Sub/Act/ Dev	Most	Unkn	Sub/Dev	Unkn	Unkn	Unkn	Unkn	Unkn
Siglec-F	ND	ND	Unkn	ND	Sub/ Dev	Sub/ Dev	Unkn	Unkn	Unkn
Syndecan-4	Sub	Most/ Dev+Act	Unkn	Unkn	Sub/ Act	Unkn	Unkn	Unkn	Sub/ Act
T and B cell activation antigen (GL7, Ly-77)	Most/Act	Most/ Act	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn	Unkn
TCR α chain	Sub	ND	ND	ND	ND	ND	ND	ND	ND
TCR β chain	Sub	ND	ND	ND	ND	ND	ND	ND	ND
TCR γ chain	Sub	ND	ND	ND	ND	ND	ND	ND	ND
TCR δ chain	Sub	ND	ND	ND	ND	ND	ND	ND	ND
TER-119/erythroid cells (Ly-76)	ND	ND	Unkn	ND	ND	ND	ND	Most	ND
Thymic medullary epithelium	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRAIL	ND	ND	ND	Most/ Act	ND	ND	Unkn	ND	Unkn
TSA-1 (Sca-2, Ly-6E)	Most/ Dev	Most	Unkn	Unkn	Sub	Sub	Unkn	Unkn	Unkn

Abbreviations:

- ND Not detected
 Dev Developmental marker
 Most On most cells
 Sub On subset of cells
 Act Activation-dependent

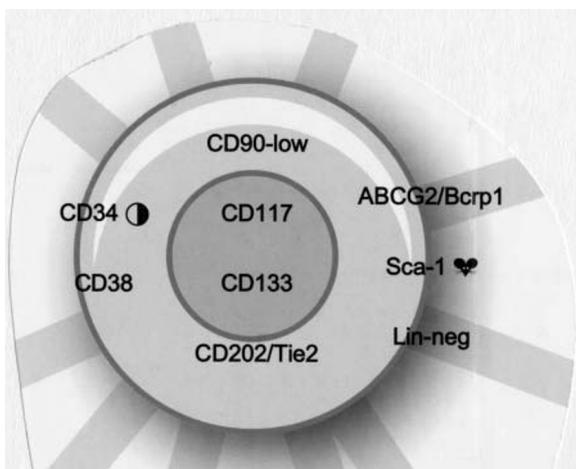


Figure 3.1 Surface antigens of hematopoietic stem cells

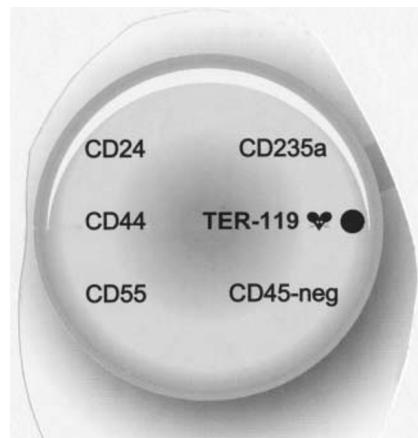


Figure 3.2 Surface antigens of erythrocytes

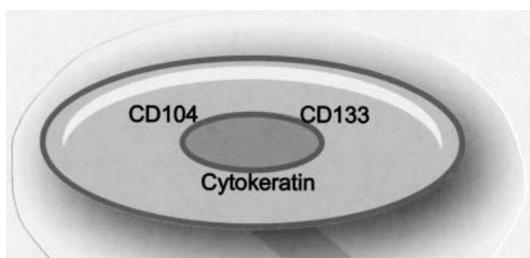


Figure 3.3 Surface antigens of epithelial cells

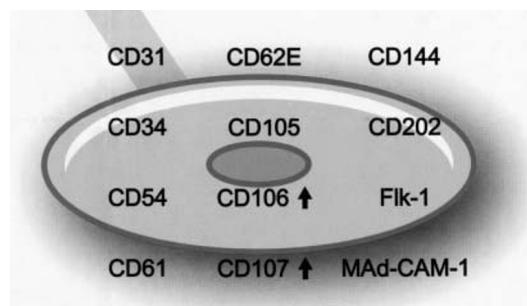


Figure 3.4 Surface antigens of endothelial cells

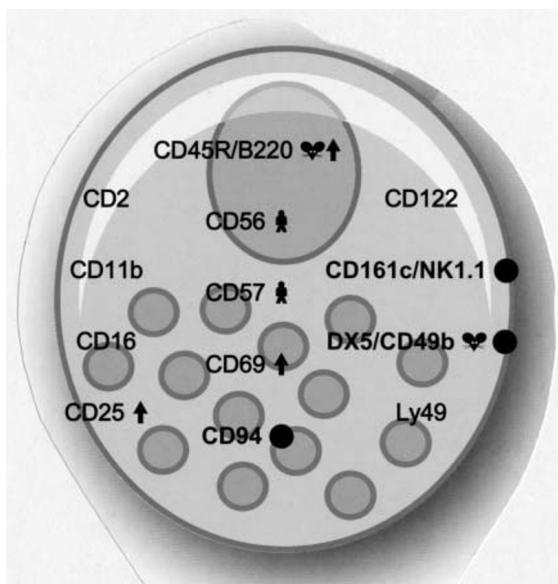


Figure 3.5 Surface antigens of natural killer cells

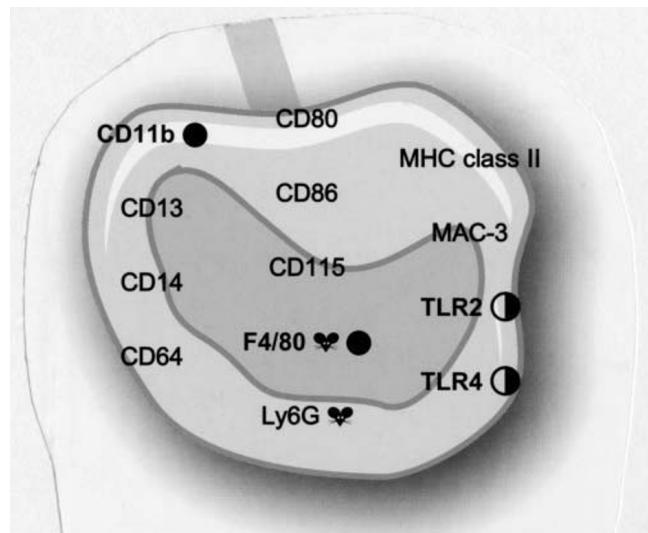


Figure 3.6 Surface antigens of monocytes/macrophages

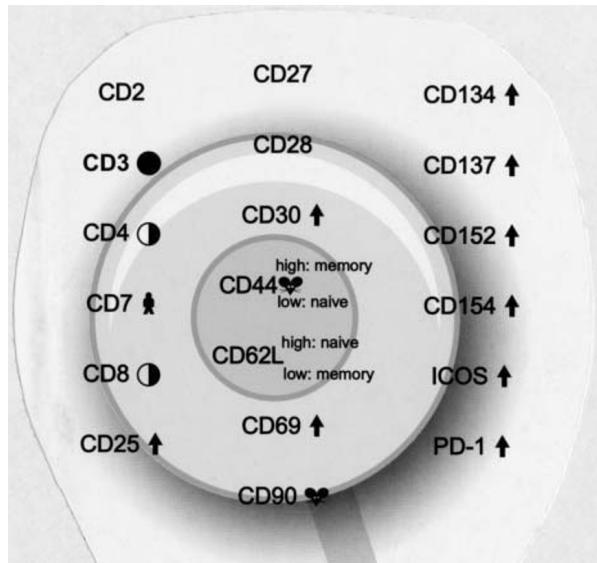


Figure 3.7 Surface antigens of T cells

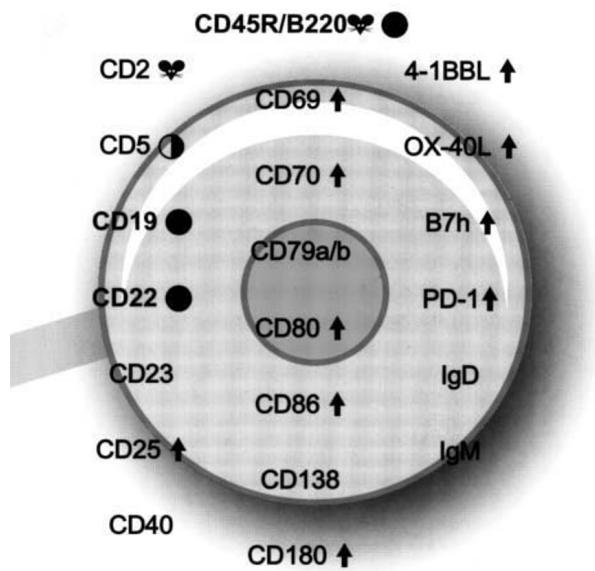


Figure 3.8 Surface antigens of B cells

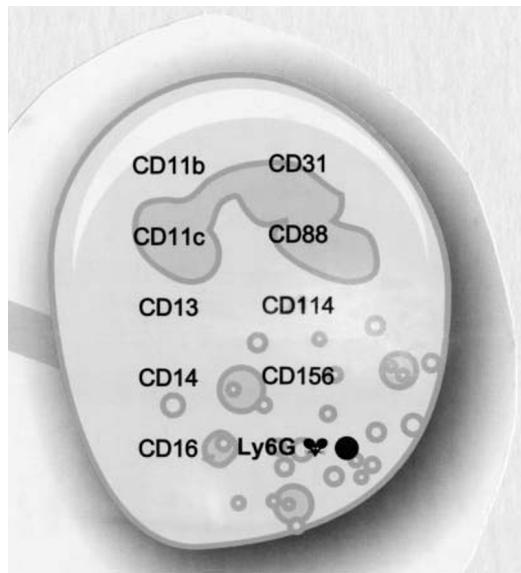


Figure 3.9 Surface antigens of granulocytes

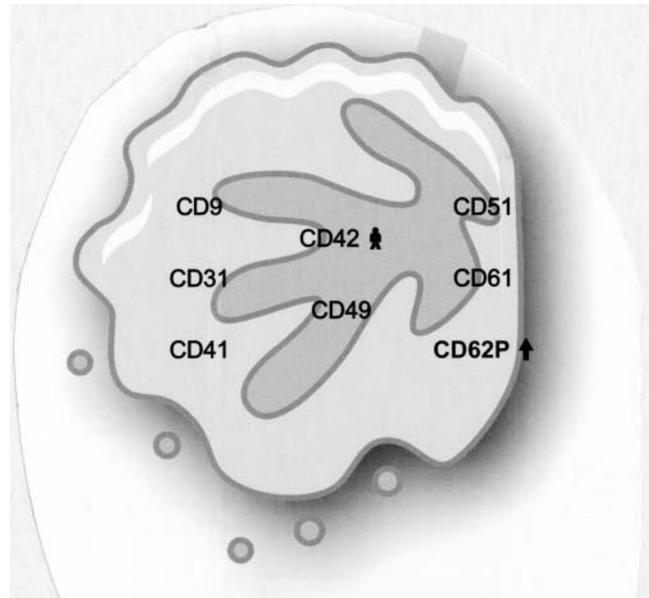


Figure 3.10 Surface antigens of megakaryocytes/platelets

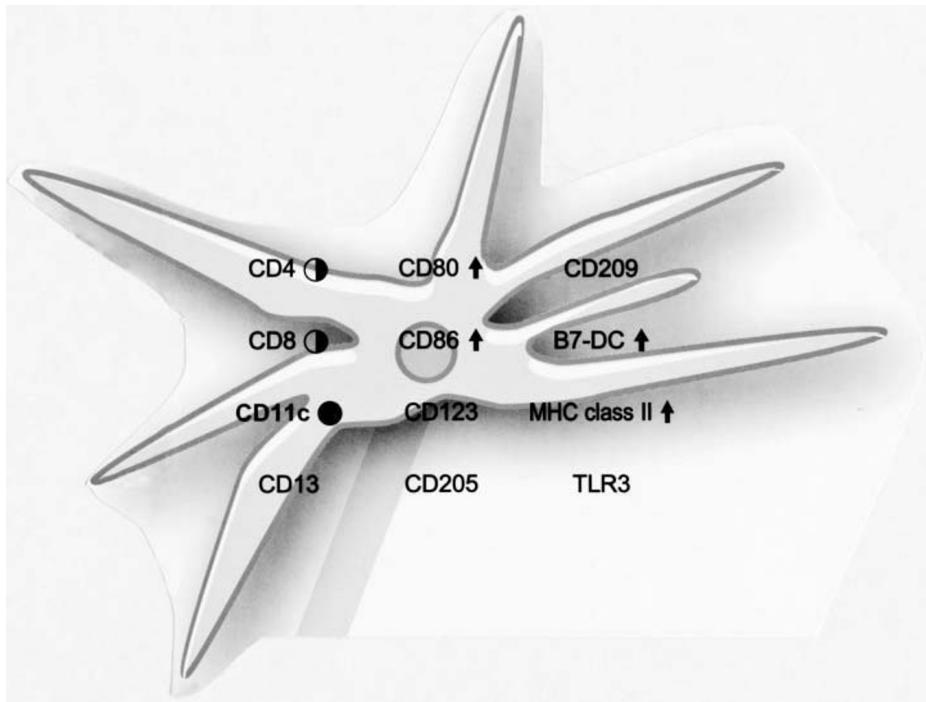


Figure 3.11 Surface antigens of dendritic cells

Table 3.5 Human leukocyte differentiation antigens

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Erythrocyte	Endothelial cell	Epithelial cell	Gene locus	CD
CD1a	R4	T		Non-peptide antigen presenting molecules; involved in lymphocyte activation; related to thymic T cell development	49/-	⊕	⊕		-	⊕	-	-	-	-	-	-	1q22-q23	CD1a
CD1b	R1	T		Non-peptide antigen presenting molecules; involved in lymphocyte activation; related to thymic T cell development	45/-	⊕	⊕		-	⊕	-	-	-	-	-	-	1q22-q23	CD1b
CD1c	M241, R7	T		Non-peptide antigen presenting molecules; involved in lymphocyte activation; related to thymic T cell development. Expressed by a subset of peripheral blood B cells	43/-	⊕	+		-	⊕	-	-	-	-	-	-	1q22-q23	CD1c
CD1d	R3	T		Non-peptide antigen presenting molecules; involved in lymphocyte activation; related to thymic T cell development		⊕	+		-		-	-	-	-	-	+ ^c	1q22-q23	CD1d
CD1e	R4	T		Non-peptide antigen presenting molecules; involved in lymphocyte activation; related to thymic T cell development					-		-	-	-	-	-	-	1q22-q23	CD1e
CD2	E-rosette R T11, LFA-2	T		Receptor for CD58, CD48, CD59 and CD15; adhesion and signal-transducing molecule	50/-	+			+		-	-	-	-	-	-	1p13	CD2
CD3	T3	T		Associated with T cell receptor α/β or γ/δ dimer, signal transduction; assembly and expression of the T cell receptor complex	20-26	+	-		-	-	-	-	-	-	-	-	11q23	CD3
CD4	L3T4, W3/25	T	MHC Class II, gp120, IL-16	Co-receptor in antigen-induced T cell activation; thymic differentiation; regulation of T-B cell adhesion; primary receptor for HIV; binds to MHC class II. Also expressed in peripheral blood monocytes, tissue macrophages, granulocytes	55	+	-		-	-	+	-	-	-	-	-	12pter-p12	CD4
CD5	T1, Tp67, Leu-1	T	CD72, BCR, gp35-37	Co-stimulatory molecule; receptor for constitutive (CD72) and inducible (gp35-37) B cell-specific molecules	58/67	+	+		-	-	-	-	-	-	-	-	11q13	CD5
CD6	T12	T	CD166	Adhesion molecule. In thymocyte resistance to apoptosis and in positive selection; important in T mature cell response to both alloantigen and self-antigen	-/105-130	+	+			-	-	-	-	-	-	-	11q13	CD6
CD7	gp40	T		Possible co-activation/adhesion modulating molecule	40	+	-		+	+	-	-	-	-	-	-	17q25.2-q25.3	CD7
CD8α	Leu2, T8	T	MHC I, Lck	Co-receptor molecule; binds to MHC class I	68/30-34	+	-		+	-	-	-	-	-	-	-	2p12	CD8α

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Endothelial cell	Epithelial cell	Erythrocyte	Platelet	Gene locus	CD
CD8β	CD8, Leu2, Lyt3	T		Co-receptor molecule; binds to MHC class I		+	-		-	-	-	-	-	-	-	-	2p12	CD8β
CD9	p24, DRAP-1, MRP-1	Platelet	CD63, CD81, CD82	Modulates cell adhesion and migration; triggers platelet activation; expressed on eosinophils and basophils	-/24,26	⊕	+		-	+	+	+	+	+	+	+	2p13	CD9
CD10	CALLA, NEP, gp100	B		Zinc metalloprotease; neutral endopeptidase; regulator of B cell growth and proliferation by hydrolysis of peptides with proliferative/anti-proliferative effects	100/-	-	-		-	+	-	-	-	-	-	+	3q25.1-q25.2	CD10
CD11a	LFA-1α Integrin αL	Adhesion structure	ICAM-1,2,3	Intracellular adhesion and co-stimulation; binds to ICAM-1, ICAM-2, ICAM-3; expressed on eosinophils and basophils	170/180	+	+		+	+	+	-	-	-	-	-	16p11.2	CD11a
CD11b	Integrin αM MAC-1α	Adhesion structure	iC3b, Fibrinogen	Adherence of polymorphonuclear neutrophils and monocytes to fibrinogen, ICAM-1 endothelium; extravasation; chemotaxis; apoptosis	165/170	+	+	+	+	+	+	-	-	-	-	-	16p11.2	CD11b
CD11c	Integrin αX, p150:95a	Adhesion structure	iC3b	Adherence of polymorphonuclear neutrophils and monocytes to fibrinogen, ICAM-1 endothelium; binds iC3b-coated particles	145/150	+	+	+	+	+	+	-	-	-	-	-	16p11.2	CD11c
CDw12	p90-120	Myeloid		Function unknown	150–160/120	-	-		+	-	+	+	-	-	-	-	CDw12	
CD13	APN, Gp150	Myeloid		Acts as receptor for coronavirus which causes upper respiratory tract infections; involved in interactions between human CMV and target cells; CD13 auto-Ab associated with GVHD	150/-	-	-		-	+	+	+	-	-	+	+	15q25-q26	CD13
CD14	LPS-R	Myeloid	LPS	Receptor for lipopolysaccharide (endotoxin)	53/55	-	-		-	+	+						5q31.1	CD14
CD15	X-hapten, Lewis X	Carbo-hydrate	CD62 selectin	May be important for direct carbohydrate-carbohydrate interactions		-	-		-	-	+	+	-	-	-	-		CD15
CD15s	Sialyl Lewis X	Carbo-hydrate and lectin	E-selectins	Expressed on myelomonocytic leukemia, some lymphocytic leukemia cells, and on adenocarcinomas		+	⊕		+	+	+	+			+			CD15s
CD15u	3' sulpho Lewis X	Carbo-hydrate and lectin	P-selectins	CD15 subgroups involved with different carbohydrate to carbohydrate cell adhesion		+	⊕		+	+	+	+	-	+				CD15u

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD	
CD15su	6 sulphosialyl Lewis X	Carbohydrate and lectin	L-selectins	CD15 subgroups involved with different carbohydrate to carbohydrate cell adhesion		+	⊕		+	+	+	+	-	+			CD15su		
CD16	FcγRIIIa	NK	Fc	Low affinity receptor for IgG. Major histocompatibility complex	50–65/-	-	-		+	+	+	+	-	-			CD16		
CD16b	FcγRIIIb	NK	Fc	Function unknown	N/A	+			+	+	+	+	-	-	+		CD16b		
CDw17	None	Myeloid		Possible role in phagocytosis. Expressed in basophils	150–160/120	+	+	+	-	+	+	+	+	-	+	+	CDw17		
CD18	Integrin β2	Adhesion structure	CD11a, b, c	Leukocyte adhesion	90/95	+	+		+	+	+	+	-	-	-	21q22.3	CD18		
CD19	B4	B	CD2, CD81, CD225	A critical signal transduction molecule that regulates B cell development, activation and differentiation	90	-	+	+	-	+	-	-	-	-	-	-	16p11.2	CD19	
CD20	B1, Bp35	B		Regulation of B cell activation and proliferation by regulating transmembrane Ca ²⁺ conductance and cell cycle progression	37/35	-	+	-	-	-	-	-	-	-	-	-	11q12-q13.1	CD20	
CD21	CR2, EBV-R, C3dR	B	C3d, CD23, CD19, CD81	Receptor for EBV and C3d, C3dg, and iC3b; subset of immature thymocytes; CD21 is part of a large signal transduction complex that also involves CD91, CD81, and Leu1	130–145	-	+	-	-	+	-	-	-	-	-	+	1q32	CD21	
CD22	BL-CAM, Lyb8	B	p72sky, p53/S6lyn, SHP1	Adhesion molecule; signalling molecule; antibody treatment of leukemia and lymphoma	135	-	+	-	-	+	-	-	-	-	-	-	-	19p13.1	CD22
CD23	FcεRII, B6, BLAST-2	B	IgE, CD21, CD11b, CD11c	Low affinity IgE receptor; regulates IgE synthesis; triggers monokine release; serum soluble CD23 level is a significant prognostic marker in CLL	50–45	-	+	-	-					-	-	-	19p13.3	CD23	
CD24	BBA-1, HSA	B	P-selectin	Function unknown; homologous to mouse heat stable antigen; P-selectin on human carcinomas is involved in carcinoma binding to platelets	41/38	-	+	-	-	-	-	+	-	-	-	+	6g21	CD24	
CD25	Tac antigen, IL-2Rα	CK/CKR	IL-2	IL-2 receptor α chain; associated with CD122 and CD132	55	⊕	+	-	+	-	-	-	-	-	-	-	10p15-p14	CD25	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Endothelial cell	Erythrocyte	Platelet	Gene locus	CD		
CD26	DPP IV ectoenzyme	T	Adenosine deaminase	Co-stimulatory molecule in T cell activation; associated marker of autoimmune diseases, adenosine deaminase-deficiency and HIV pathogenesis	120	+	+	-	+	-	-	-	-	-	-	2q24.3	CD26		
CD27	T14, S152	T	CD70, TRAF5, TRAF2	Mediates a co-stimulatory signal for T cell activation. Involved in murine T cell development	110–120	+	+	-	+	-	-	-	-	-	-	-	12p13	CD27	
CD28	Tp44, T44	T	CD80, CD86	Co-stimulates T cell proliferation and cytokine production with CD3; co-stimulates T cell effector function and T cell-dependent antibody production	90	+	-	-	-	-	-	-	-	-	-	-	2q33	CD28	
CD29	Platelet GPIIa, β-1 integrin	Adhesion structure	VCAM-1 and MAdCAM-1	Critical molecule for embryogenesis and development; essential to the differentiation of hematopoietic stem cells; associated with tumor progression and metastasis/invasion	110–130	+	+		+	+	+	+	+	+	+	+	10p11.2	CD29	
CD30	Ber-H2, Ki-1	Non-lineage	CD153, TRAF1,2,3,5	Member of TNFR family, involved in negative selection of T cells in thymus and TCR-mediated cell death; expressed on R-5 cells in Hodgkin's lymphomas	120	⊕	⊕		⊕	-	-	-	-	-	-	-	1p36	CD30	
CD31	PECAM-1, endocam	Adhesion structure	CD38	Adhesion receptor with signaling function that participates in an adhesion cascade; transendothelial migration cell–cell adhesion	130–140	+	+		+	+	+	+	+	-	+		17q23	CD31	
CD32	FCγRII	Non-lineage	Phosphatases	Regulates B cell functions; major player in immune complex-induced tissue damage	40	-	+		-	+	+	+	+	-	-		1q23	CD32	
CD33	P67	Myeloid	Sugar chains	Diagnosis of acute myelogenous leukemia; negative selection for human self-regenerating hematopoietic stem cells	67	-	-		-	+	+	+	-	-	-	-	19q13.3	CD33	
CD34	gp 105–120	Adhesion structure	L-selectin	Cell adhesion; CD34 also expressed on embryonic fibroblasts and nervous tissue	105–120	-	-	-	-	+	-	-	-	-	+		1q32	CD34	
CD35	CR1, C3b/C4b receptor	Myeloid	C3b, C4b, iC3, iC4	C3b/C4b receptor; promotes phagocytosis (immune adherence); plays a major role in removal of immune complexes; regulates complement activation	160–250	+	+	+	-		+	+	-	+				1q32	CD35
CD36	GpIIb, GPIV	Platelet	Thrombospondin	Recognition and phagocytosis of apoptotic cells; involved in platelet adhesion and aggregation; cytoadherence of plasmodium falciparum-infected erythrocytes	90	-	-	+	-	+	+	-	-	+	+	-	7q11.2	CD36	
CD37	gp52–40	B	CD53, CD81, CD82, MHC II	Involved in signal transduction	40–52/40–52	+	+		-		+	+	-	-	-		19p13–q13.4	CD37	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Endothelial cell	Epithelial cell	Gene locus	CD	
CD38	ADP-ribosyl cyclase, T10	B	CD31	Regulates cell activation and proliferation; involved in lymphocyte and endothelial cell adhesion	45/45	+	+		+	+	+	-			4p15	CD38	
CD39	None	B	ADP/ATP	May protect cells from lytic effects of extracellular ATP	80/80	⊕	+	+	+		+	-	+	+	10q24	CD39	
CD40	Bp50	B	CD40L	Involved in B cell growth, differentiation and isotype switching; potent rescue signal from apoptosis; promotes cytokine production	85/48	-	+	+	-	+	+	-	-	+	20q12-q13.2	CD40	
CD41	GPIIb, αIIb integrin	Platelet	Fg, Fn, vWF	CD41/CD61 complex plays a central role in platelet activation and aggregation	135/ 120, 23	-	-	-	-	+	-	-	+	-	17q21.32	CD41	
CD42a	GPIX	Platelet	vWF, thrombin	Forms complex with GPIbα, GPIbβ, and GPV, which binds to vWF and thrombin	22/ 17-22	-	-	-	-	+	-	-	+	-	3q21	CD42a	
CD42b	GPIbα	Platelet	vWF, thrombin	Forms complex with GPIX, GPIbβ, and GPV, which binds to vWF and thrombin	160/ 145	-	-	-	-	+	-	-	+	-	17pter-p12	CD42b	
CD42c	GPIbβ	Platelet	vWF, thrombin	Forms complex with GPIX, GPIbα, and GPV, which binds to vWF and thrombin	160/ 24	-	-	-	-	+	-	-	+	-	22q11.21	CD42c	
CD42d	GPV	Platelet	vWF, thrombin	Forms complex with GPIX, GPIbα, and GPIbβ, which binds to vWF and thrombin	82/82	-	-	-	-	+	-	-	+	-	3	CD42d	
CD43	Sialophorin, leukosialin	Non-lineage	Hyaluronan	Anti-adhesion molecules mediates repulsion between leucocytes and other cells; under some circumstances it may act as an adhesion molecule	95- 135/ 95- 135	+	-		+	+	+	+	+	-		16p11.2	CD43
CD44	ECMRII, H-CAM, Pgp-1	Adhesion structure	Hyaluronan	An adhesion molecule in lymphocyte-endothelial cell interaction; a differentiation antigen during lymphopoiesis; a potential marker of malignancy and metastasis	85/-	+	+		+		+	+	-	+	+	11p13	CD44
CD44R	CD44v, CD44v9	Adhesion structure	Hyaluronan	Involved in adhesion of leukocytes and endothelial cells; leukocyte homing	85/ 200/-						⊕				+	11p13	CD44R
CD45	LCA, T200	Non-lineage	p56, p59, Src kinases	Critical requirements for TCR- and BCR-mediated activation; possible requirement for receptor-mediated activation in other leukocytes	180- 220/-	+	+	+	+	+	+	+	-	-	-	1q31-q32	CD45

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD45RA		Non-lineage	p56, p59, Src kinases	Critical requirement for TCR- and BCR-mediated activation; expressed on resting/naive T cells; possible requirement for receptor-mediated activation in other leukocytes	220	+	+	+	+	+	+	-	-	-	-	1q31-q32	CD45RA	
CD45RB		Non-lineage	p45, p59, Src kinases	Critical requirement for TCR- and BCR-mediated activation; possible requirement for receptor-mediated activation in other leukocytes	220	+	+	+	+	+	+	+	-	+	-	-	1q31-q32	CD45RB
CD45RC		Non-lineage	p56, p59, Src kinases	Critical requirement for TCR- and BCR-mediated activation; possible requirement for receptor-mediated activation in other leukocytes	220	+	+	+	+	+	+	-	-	-	-	-	1q31-q32	CD45RC
CD45RO	UCHL-1	Non-lineage	p56, p59, Src kinases	Critical requirement for TCR- and BCR-mediated activation; expressed on activated/memory T cells; possible requirement for receptor-mediated activation in other leukocytes	180	⊕	+	+	+	+	+	+	-	-	-	-	1q31-q32	CD45RO
CD46	MCP	Non-lineage	SCR	Co-factor for factor I proteolytic cleavage of C3b and C4b	52–58/ 64–68	+	+		+	+	+	+	+	-	+	+	1q32	CD46
CD47	gp42, IAP, OA3	Adhesion structure	SIRP	Adhesion molecule; thrombospondin receptor	45–60/ 50–55	+	+		+	+	+	+	+	+	+	+	3q13.1-q13.2	CD47
CD47R	MEM-133	Non-lineage		CDw149 mAbs actually recognized with low affinity the CD47 glycoprotein	120/-	+	+		+	+	+	+	+	+	+	+	3q13.1-q13.2	CD47R
CD48	Blast-1, Hu lym3	Non-lineage	CD2, lck, fyn	Adhesion molecule; acts as an accessory molecule for γ/δ T-cell recognition; as predicted for α/β T-cell antigen recognition	45/45	+	+		+	+	+	-	-	-	-	-	1q21.3-q22	CD48
CD49a	VLA-1α, α1 integrin	Adhesion structure	Collagen, laminin-1	Adhesion receptor	200/ 200	⊕	-		⊕	-	-	-	-	-	-	-	5	CD49a
CD49b	VLA-2α, GPIa	Adhesion structure	Collagen, laminin	Adhesion molecule	150/ 160	⊕	+		+	+	+	-	+	-	+	+	5q23-31	CD49b
CD49c	VLA-3α, α3 integrin	Adhesion structure	laminin-5, Fn, collagen	Component of adhesion receptor; associates with TM4 of protein; may be involved in signal transduction	145–150/ 125,30	-			-	+					+	+	17q21.31	CD49c
CD49d	VLA-4α, α4 integrin	Adhesion structure	CD106, MAdCAM	Cell adhesion; lymphocyte migration; tethering or rolling and homing of T cells	145/ 150	+	+	+	+	+	⊕	-	-	-	-	+	2q31-q32	CD49d

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD49e	VLA-5 α , α 5 integrin	Adhesion structure	Fibronectin, invasin	Adhesion molecule	160/ 135, 25	+		+	+	+			-	+	+	12q11-q13	CD49e	
CD49f	VLA-6 α , α 6 integrin, gp1c	Adhesion structure	Laminins, invasin	Component of adhesion receptor; CD49f/CD29-mediated T cell binding to laminin receptor provides a co-stimulatory signal to T cells for activation and proliferation	150/ 125	+				+	+		+	+	+	2p14-q14.3	CD49f	
CD50	ICAM-3	Adhesion structure	LFA-1, integrin ad/b2	Co-stimulatory molecule; regulates LFA-1/ICAM-1 and integrin- β 1-dependent pathways adhesion; soluble form can be detected in the blood	110/ 140/-	+	+		+	+	+	+	-	-	+	-	19p13.3-p13.2	CD50
CD51	Integrin α v, VNR- α	Platelet	Arg-Gly-Asp	Involved in cell adhesion and signal transduction; role in bone metabolism and apoptosis; possible role in infection	150/ 124, 24						+	-	+		+	2q31-q32	CD51	
CD52	CAMPATH-1, HE5	Non-lineage		CD52 antibodies are remarkably lytic for target cells, both with human complement and by antibody-dependent cellular cytotoxicity	25- 29/ 25-29	+	+		+		+		-	-	+	1p36	CD52	
CD53		Non-lineage	VLA-4, HLA-DR	Signal transduction; CD53 cross-linking promotes activation of B cells	32- 42/	+	+	-	+	+	+	+	-	-	+	-	1p31-p12	CD53
CD54	ICAM-1	Adhesion structure	LFA-1, Mac-1, rhinovirus	Involved in immune reaction and/or inflammation; receptor for Rhinovirus or RBCs infected with malarial parasite; soluble form can be detected in the blood	90/95	+	+				+				+	19p13.3-p13.2	CD54	
CD55	DAF	Non-lineage	SCR, CD97	Complement regulation by decay acceleration; ligand or protective molecule in fertilization; involved in signal transduction; soluble form can be detected in plasma and body fluid	55- 70/80	+	+		+	+	+	+	+	+	+	+	1q32	CD55
CD56	Leu-19, NKH-1, NCAM	NK	NCAM, Heparin sulfate	Homophilic and heterophilic adhesion	140	+			+							11q23-q24	CD56	
CD57	HNK1, Leu-7	NK	L-selectin, P-selectin Laminin	Cell-cell adhesion	110- 115				+								CD57	
CD58	LFA-3	Adhesion structure	CD2	Mediates adhesion between killer and target cells, antigen-presenting cells and T cells; activation of killer cells; co-stimulatory molecule	55-70	+	+	+	+		+	+		+	+	1p13	CD58	
CD59	IF5Ag, H19	Non-lineage	C8- α , C9, lck, fyn	Associates with C9, inhibiting incorporation into C5b-8 preventing the completion of MAC formation	18-25	+			+		+	+		+		11p13	CD59	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	NK cell	Dendritic cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD60a	GD3	Carbo-hydrate and lectin		Induces mitochondrial permeability transition during apoptosis; marker for malignant melanomas		+	+			+	+	+	-				CD60a	
CD60b	9-0-acetyl CD3	Carbo-hydrate and lectin	9-0-acetyl-CD3	mAbs immunoreactive to CD60b have co-mitogenic activity of synovial T cells; also observed on some breast carcinomas and melanomas	90–94/120	+				+	+	+			+		CD60b	
CD60c	7-0-acetyl CD3	Carbo-hydrate and lectin		T cell activation receptor; T cell activation by CD60c does not require co-stimulatory signals		+				+	+						CD60c	
CD61	GP IIIa, β_3 integrin	Platelet	Fibrinogen	CD41/61 mediates attachment of cells to diverse matrix proteins	90–110					+		+	+	+	17q21.32	CD61		
CD62E	E-selectin	Adhesion structure	(CD15s)	Mediates leukocyte rolling on activated endothelium at inflammatory sites; may support cell adhesion during hematogenous metastasis and play a role in angiogenesis	115									+	1q22-q25	CD62E		
CD62L	L-selectin	Adhesion structure	CD34, GlyCAM-1, M	Mediates lymphocyte homing to high endothelial venules or peripheral lymphoid tissue and leukocyte rolling on activated endothelium at inflammatory sites	74	+	+		+	-	+	+			1q23-q25	CD62L		
CD62P	P-selectin, GMP-140	Platelet	CD162, CD24	Interaction of CD62P and CD162 mediates tethering and rolling of leukocytes on the surface of activated endothelial cells; mediates rolling of platelets on endothelial cells	120								+	+	1q22-q25	CD62P		
CD63	LIMP, MLA1, gp55	Platelet	VLA-3, VLA-6, CD81	CD63 gene may play a role in tumor suppression; expression of CD63 in melanoma cells reduces metastasis	40–60			+		+	+	+	+	+	12-q12-q13	CD63		
CD64	FCRI	Myeloid	IgG	Receptor-mediated endocytosis of IgG-antigen complexes; antigen capture for presentation to T cells. ADCC	72	-	-	+	-	+	+		-	-	-	1q21.2-q21.3	CD64	
CD65	Ceramide, VIM-2	Myeloid	E-selectin	Function unknown							+	+					CD65	
CD65s	Sialylated-CD65, VIM2	Myeloid	Possibly E- or P-selectin	VIM2 antibody has been described to inhibit phagocytosis and to induce phagocyte calcium flux and oxidative burst		-	-		-	+	+	-	-	-			CD65s	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD66a	NCA-160, BGP	Myeloid		Homophilic and heterophilic adhesion; E-selectin binding; capable of activating granulocytes; functions as a receptor for <i>Neisseria gonorrhoea</i>	140–180	—	—	—	—	+	—	—	—	—	+		CD66a	
CD66b	CD67, CGM6, NCA-95	Myeloid		Capable of heterophilic adhesion and transmembrane signaling; capable of activating neutrophils	95–100	—	—	—	—	+	—	—	—	—	—	19q13.2	CD66b	
CD66c	NCA, NCA-50/90	Myeloid		Homophilic and heterophilic adhesion, E-selectin binding; capable of activating granulocytes; functions as a receptor for <i>Neisseria gonorrhoea</i>	90	—	—	—	—	+	—	—	—	—	+	19q13.2	CD66c	
CD66d	CGM1	Myeloid		Capable of activating granulocytes. Functions as a receptor for <i>Neisseria gonorrhoea</i>	35	—	—	—	—	+	—	—	—	—	—	19q13.2	CD66d	
CD66e	CEA	Myeloid		Homophilic and heterophilic adhesion	180–200	—	—	—	—	—	—	—	—	—	+	19q13.2-q13.2	CD66e	
CD66f	SP-1, PSG	Myeloid		Unclear, may be involved in immune regulation and regulation and protection of fetus from maternal immune system; necessary for successful pregnancy	54–72	—	—	—	—	—	—	—	—	—	+	19q13.2	CD66f	
CD68	gp110, macrosialin	Myeloid	LDL	Lysosomal membrane glycoprotein (LAMP 1 group); possible receptor	110	+ ^c	+ ^c	+ ^c	—	—	—	17p13	CD68					
CD69	AIM, EA 1, MLR3, gp34/28	NK		Involved in lymphocyte, monocyte, and platelet activation	60	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	+	+	+	12p13-p12	CD69
CD70	Ki-24	Non-lineage	CD27	Co-stimulation of T and/or B cells; enhances the proliferation of cytotoxic T cells and cytokine production. Co-stimulates B cell proliferation and Ig production	55–170	⊕	⊕	—	—	—	—	—	—	—	—	—	19p13	CD70
CD71	T9, Transferrin receptor	Non-lineage	Transferrin	Controls the supply of iron uptake during proliferation	190	—	—	—	—	+	—	—	—	—	+	3q26.2-pter	CD71	
CD72	Ly-19.2, Ly-32.2, Lyb-2	B	CDS	Plays a role in downregulation of signaling through the BCR on B cells as a regulator of signaling thresholds	43/39	—	+	+	—	+	—	—	—	—	—	—	9p	CD72
CD73	Ecto-5-nucleotidase	B	AMP	Hydrolyzes adenosine monophosphate into adenosine; can mediate co-stimulatory signals in T cell activation	69–72	+	+	+	—	+	—	—	—	—	—	+	6q14-q21	CD73
CD74	invariant chain	B	HLA-DR, CD44	Intracellular sorting of MHC class II molecules; also known as Class II specific chaperone li	41	+	+	—	—	—	+	—	—	—	+	+	5q32	CD74

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Endothelial cell	Erythrocyte	Epithelial cell	Gene locus	CD	
CD75	Sialo-masked lactosamine	Carbohydrate and lectin		CD75 is newly clustered including CDw75 and CDw76, CDw76 has been deleted		–	+		–	+	–	–	–	+	–	–	CD75		
CD75s	a2, 6 sialylated lactosamine	Carbohydrate and lectin	CD22 (proposed)	May be involved in regulation of CD95-mediated apoptosis and may be important for infection by a lymphotropic virus		+	+		–	+	+	–	+	+	+	+	CD75s		
CD77	Pk antigen/BLA/CTH/Gb3	B	Receptor for Shiga toxin	Cross-linking of CD77 induces apoptosis in Burkitt's lymphoma cells	1	–	+		–	–	–	–	–	–	+	+	CD77		
CD79a	Ig α/MB1	B	Ig/CD5/CD19/CD22/CD79b	Transmits signals into cytoplasm upon antigen-binding to surface Iggs	40–45	–	+									19q13.2	CD79a		
CD79b	Ig β/B29, BCR	B	Ig/CD5/CD19/CD22/CD79a	B cell antigen receptor (BCR) mediates the response of B cells to foreign antigens and determines the fate of B cells during development and differentiation	-/37	–	+		–	–	–	–	–	–	–	+	17q23	CD79b	
CD80	B7-1/BB1	B	CD28/CD152 (CTLA-4)	Co-regulation of T-cell activation with CD86	60/-	⊕	⊕	+	–	–	+	–	–	–	–	–	3q13.3-q21	CD80	
CD81	TAPA-1	B	Leu-13/CD19/CD21	Member of CD19/CD21/Leu-13 signal transduction complex. #Or ly on eosinophils, not neutrophils	26/-	+	+	+	+	+	+	+	#	–	–	+	+	11p15	CD81
CD82	4F9/C33/IA4/KAI1/R2	B		Signal transduction. #Also associates with MHC class I and II, β1 integrins, CD4 and CD8	45–90/-	+	+		+	+	+	+	+	–	+	+	11p11.2	CD82	
CD83	HB15	B	Unknown	Function unknown	-/43	–	+	+	–	–	–	–	–	–	–	–	6p23	CD83	
CD84	None	B	Unknown	Function unknown, some indication that it may be a signaling molecule	68–80	+	+		–	+	–	–	–	–	–	–	1q24	CD84	
CD85a*	ILT5/LIR3/HL9	Dendritic cell	HLA class I	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity		+	–	+	–	+	+	+	–	–	–	–	19q13.4	CD85a*	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Epithelial cell	Endothelial cell	Erythrocyte	Granulocyte	Macrophage/monocyte	Platelet	Gene locus	CD	
CD85b*	ILT8	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity												19q13.4	CD85b*	
CD85c*	LIR8	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity												19q13.4	CD85c*	
CD85d*	ILT4/LIR2/MIR 10	Dendritic cell	HLA class I	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	110	—	—	+	—	—	+	+	—	—	—	19q13.4	CD85d*	
CD85e*	ILT6/LIR4	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity												19q13.4	CD85e*	
CD85f*	ILT11	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity. Mainly expressed on PBL												19q13.4	CD85f*	
CD85g*	ILT7	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity												19q13.4	CD85g*	
CD85h*	ILT1/LIR7	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity. Expressed on myeloid cells and some NK cells												19q13.4	CD85h*	
CD85i*	LIR6a	NK	FcR γ	Involved with activation of NK-mediated cytotoxicity												19q13.4	CD85i*	
CD85j*	ILT2/LIR1/MIR7	Dendritic cell	HLA class I	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	110	+	+	+	+	—	+	+	—	—	—	19q13.4	CD85j*	
CD85k*	ILT3/LIR5/HM18	Dendritic cell	HLA class I	Ligation of CD85K induces an inhibitory signal via recruitment of SHP-1 phosphatase	60	—	—	+	—	+	+	+	—	—	—	19q13.4	CD85k*	
CD85l*	ILT9	NK	FcR γ	Binds FcR γ												19q13.4	CD85l*	
CD85m*	ILT10	NK	FcR γ	Binds FcR γ												19q13.4	CD85m*	
CD86	B7-2/B70	B	CD28/CD152 (CTLA-4)	Co-regulator of T cell activation with CD80	-/80	⊕	⊕	+	—	—	+	—	—	—	—	3q21	CD86	
CD87	uPAR	Myeloid	uPA/Pro-UPA/vitronectin	CD87 serves as the cellular receptor for pro-uPA and uPA	35–68/32–66	+	—	+	+	—	+	+	—	—	+	—	19q13	CD87
CD88	C5aR	Myeloid	C5a/C5a(desArg)	C5a-mediated inflammation; activation of granulocytes	43/-	—	—	+	—	—	+	+	—	—	+	+	19q13.3-q13.4	CD88
CD89	IgA FC receptor	Myeloid	IgA1/IgA2	Induces phagocytosis, degranulation, respiratory burst, and the killing of microorganisms	45–100/45–100	—	—	—	—	—	+	+	—	—	—	—	19q13.2-q13.4	CD89

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD90	Thy-1	Endothelial cell	CD45/lck/fyn/P100	May contribute to lymphocyte co-stimulation, inhibition of stem cell proliferation/differentiation and neuron memory formation	25–35/25–35	–	–	–	+	–	–	–	–	+	–	11q22.3-q23	CD90
CD91	ALPHA2M-R/LRP	Myeloid	ALPHA2M/LDLs	Endocytosis-mediating receptor expressed in coated pits. #Expressed on erythroblast/reticulocytes	600/-	–	–	–	+#	+	–	–	–	–	–	12q13-q14	CD91
CD92	None	Myeloid	Unknown	Function unknown	70/70	+	+			+	+	–	–	+	+		CD92
CDw93	None	Myeloid	Unknown	Function unknown	110/120	–	–	–	–	–	+	+	–	–	+	–	CDw93
CD94	Kp43	NK	HLA class I	Assembled with other C-type lectins (NKG2) forms inhibitory or activating receptors for HLA class I	70, 30	+	–	+		–	–	–	–	–	–	12q13	CD94
CD95	APO-1, FAS, TNFRF6	Cytokine receptor	Fas ligand	Receptor molecule for Fas ligand, which mediates apoptosis-inducing signals	45, 90, 200/45	+	+	+		+	+	–	–	–	–	10q24.1	CD95
CD96	TACTILE	NK		Adhesion of activated T and NK cells during the late phase of immune response; weakly expressed by peripheral resting NK or T cells, upregulated after activation	160/-	⊕	–	⊕		–	–	–	–	–		CD96	
CD97		Non-lineage	CD55	Member of the EGF-TM7 family; weakly expressed on resting lymphocytes, upregulated by activation	/28, 75–85	⊕	⊕	+	⊕	+	+	–	–	–	–	19p13.2-p13.12	CD97
CD98	4F2, FRP-1, RL-388	Non-lineage	actin	Possible amino acid transporter; broad reactivity on activated and transformed cells, not hematopoietic specific, and found at lower levels on quiescent cells	125/80, 45	+	+	+	+	+	+	+	–	+	+	11q13	CD98
CD99	MIC2, E2	T		Modulates T-cell adhesion; induces apoptosis of double-positive thymocytes; expressed on all hemological cells and present on many other cell types	32/32	+	+	+		+	–	+	+	+	+	Xp22.32, Yp11.3	CD99
CD99R	CD99 Mab restricted	T		Modulates T-cell adhesion; induces apoptosis of double-positive thymocytes	32/32	+	–	+	–	+		–	–	–	–	9q22-q31	CD99R
CD100	SEMA4D	Non-lineage	CD45, serine kinase	Co-stimulatory molecule for T-cells; increases PMA, CD3, and CD2 induced T cell proliferation; Soluble form is 120 kD	300/150	+	+	–	+	–	+	+	–	–	–	9q22-q31	CD100

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Endothelial cell	Epithelial cell	Gene locus	CD	
CD101	IGSF2, P126, V7	Myeloid		Co-stimulatory molecule; antibodies against CD101 inhibit allogenic T cell responses and co-stimulate T cell proliferation with suboptimal anti-CD3 activation	240/120	⊕	—	+	—	+	+	—	—	—	1p13	CD101	
CD102	ICAM-2	Adhesion structure	LFA-1, CD11b/CD18	Provides co-stimulatory signal in immune response; lymphocyte recirculation; expressed on some resting lymphocytes	55–65/	+	+		+	+	—	+	—	+	17q23-q25	CD102	
CD103	HML-1, integrin αE	Adhesion structure	E-cadherin; integrin β7	Expressed on intestinal intraepithelial lymphocytes, lamina propria T cells in intestine; stimulation of PBL with PHA induce CD103 expression	175/150,25	⊕	—		—	—	—	—	—	—	17p13	CD103	
CD104	β4 integrin chain, TSP-180	Adhesion structure	Laminins (I, II, IV, V), CD49F	Hemidesmosomal CD49f/CD104 (α6β4 integrin) plays an important role in the adhesion of epithelia to basement membranes. #CD4-CD8- pre-T cells	205/220	—	—		—	+#	+	—	—	—	17q11-pter	CD104	
CD105	Endoglin	Endothelial cell	TGF-β 1, TGF-β 3	Regulatory component of the TGF β receptor complex; modulator of cellular responses to TGF-1 β	180/90	—	—		—	+	+	—	—	—	+	9q33-q34.1	CD105
CD106	VCAM-1, INCAM-110	Endothelial cell	Integrin α4β1	Leukocyte adhesion, transmigration and co-stimulation of T cell proliferation; expressed on activated endothelial cells, follicular dendritic cells, and certain tissue macrophages [#]	110/110	—	—	+#	—	+#	—	—	—	—	⊕	1p32-p31	CD106
CD107a	LAMP-1	Platelet		Possible role in cell adhesion; highly metastatic tumor cells express more LAMP molecules on the cell surface than poorly metastatic cells; expressed on lysosomal membrane	100–120/	⊕	—		—	+	⊕	⊕	—	⊕	+	13q34	CD107a
CD107b	LAMP-2	Platelet		Possible role in cell adhesion; highly metastatic tumor cells express more LAMP molecules on the cell surface than poorly metastatic cells; expressed on lysosomal membrane	100–120/	—	—		—	—	⊕	⊕	—	⊕	Xq24	CD107b	
CD108	SEMA7A, JMH	Non-lineage	CD232	Function unknown; carries JMH blood group antigen; expressed at low levels on circulating lymphocytes, at moderately high levels by cells and lymphoblastic cell lines	76/80	+	+					—	—	+		15q22.3-q23	CD108
CD109	8A3, 7D1, E123	Endothelial cell		Function unknown	170/170	⊕	—		—	+	—	—	⊕	—	+		CD109
CD110	TPO-R, MPL, C-MPL	Platelet	TPO	Receptor for TPO. Receptor binding results in the prevention of apoptosis, stimulation of cell growth and differentiation of megakaryocyte and platelet formation	82–92/	—	—	—	—	+	—	—	—	+	—	1p34	CD110

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD	
CD111	HveC, PRR1, PVRL1, nectin1	Myeloid	gD, nectin3, afadin	Intercellular adhesion molecule; involved in epithelial cell physiology; pan-alphaherpes virus entry receptor	-/75	-	-			+	+	+	-	+	+	+	11q23-q24	CD111	
CD112	HveB, PRR2, PVRL2, nectin2	Myeloid	PRR3, afadin	Homophilic adhesion receptor that could play a role in the regulation of hematopoietic/endothelial cell functions; involved in cell to cell spreading of viruses	72, 64/ 72, 64	-	+			+	+	+	+	-	+	+	19q13.2-13.4	CD112	
CD114	CSF3R, G-CSFR, HG-CSFR	Myeloid	G-CSF, Jak1, Jak2	Regulates myeloid proliferation and differentiation	130	-	-	-	+	+	+	-	-	+	1p35-p34.3	CD114			
CD115	c-fms, CSF-1R, M-CSFR	Myeloid	CSF-1	Receptor for CSF-1 (macrophage colony stimulating factor); mediates all of the biological effects of this cytokine	150	-		-	-	+	+	-	-	-	-	5q33.2-33.3	CD115		
CD116	GM-CSFR α	CD/CKR	GM-CSF	Primary binding subunit of GM-CSF with low affinity and binds it with high affinity when it is coexpressed with the common beta subunit CDw131	80	-	-	+	-	+	+	+	-	-	-	Xp22.32 or Yp11.3	CD116		
CD117	c-KIT SCRF	CK/CKR	SCF, MGF, KL	Growth factor receptor, tyrosine kinase	145	-	-	-	-	+	-	-	-	-	-	4q11-q12	CD117		
CDw119	iFN- γ R, IFN γ Ra	CK/CKR	IFN γ	Interferon γ binding	80-95	+	+	+	+		+	+	+	-	+	+	6q23-q24	CDw119	
CD120a	TNFRI, p55	CK/CKR	TNF, TRADD, TRAF, RiP, LT α	Programmed cell death anti-viral activity; receptor for TNF	55	+	+	+	+		+	+	+	-	+	+	12p13.2	CD120a	
CD120b	TNFRII, p75, TNFR p80	CK/CKR	TNF, TRADD, TRAF, RiP, LT α	Programmed cell death anti-viral activity; receptor for TNF	75	+	+	+	+		+	+		-	+	+	1p36.3-p36.2	CD120b	
CD121a	IL-1R type 1	CK/CKR	IL-1 α and IL-1 β	IL-1 signaling	75-85/ 75-85	+	+	-	-		-	-	-	-	-	+	2q12	CD121a	
CD121b	IL-1R type 2	CK/CKR	IL-1 β , IL-1R α , IL-1 α	Negative regulator of IL-1	60-68/ 60-68	+	+				+	+	-	-	-	+	2q12-q22	CD121b	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD122	IL2R β	CK/CKR	IL-2, IL-15, CD25, CD132	Critical component of IL-2 and IL-15-mediated signaling	70-75/-	+	+		+		+	-	-	-	-	22q13.1	CD122	
CD123	IL-3R α subunit	CK/CKR	IL-3	Primary low affinity binding subunit of IL-3 receptor	70	-	-	+		+	+	+		+	Xp22.3 or Yp11.3	CD123		
CD124	IL-4R	CK/CKR	IL-4, IL-13	Receptor subunit for IL-4 and IL-13; [#] expression on B cells is upregulated by LPs, anti-IgM or IL-4; [#] on T cells is increased by stimulation with ConA or IL-4	140/-	⊕#	⊕#		-		+	+	-	-	-	16p11.2-12.1	CD124	
CD125	IL-5R α	CK/CKR	IL-5	Low affinity receptor for IL-5; alpha chain of IL-5 receptor; expressed on eosinophils and basophils	60/-	-	⊕		-		-	+	-	-	-	3p26-p24	CD125	
CD126	IL-6R	CK/CKR	IL-6	Required, in association with gp130(CD130), for mediating biological activities of interleukin-6; expressed on hepatocytes and some non-hematopoietic cells	80/80	+	⊕		-		+	-	-	-	-	1q21	CD126	
CD127	IL-7R α	CK/CKR	IL-7, CD132, fyn, yn, Jak1	Specific receptor for IL-7; expression downregulated following T cell activation	65-90/-	+	+			+		-	-	-	-	5p13	CD127	
CD128a	IL-8RA, CXCR1	CK/CKR	IL-8	Critical regulation of IL-8 mediated neutrophil chemotaxis and activation; potential role in angiogenesis	44-59/67-70	+	-		+	-	+	+	+	+	+	2q35	CD128a	
CD128b	IL-8RB, CXCR2	CK/CKR	IL-8	Critical regulators of IL-8 mediated neutrophil chemotaxis and activation; potential role in angiogenesis	44-59/67-70	+	-		+	-	+	+	+	+	+	2q35	CD128b	
CD130	gp130	CK/CKR	Oncostatin M	Required for transducing biological activities of IL-6, IL-11, LIP, ciliary neutrophilic factor, oncostatin M, and cardiotrophin-1	130-140/130-140	+	+		+		+	+	+	+	+	5q11	CD130	
CD131	Common beta subunit	CK/CKR	CD123, CD125, CD116	Key signal transducing molecule of the IL-3, GM-CSF, and IL-5 receptors; expressed on early B cells and early progenitors	120-140/-	-	-		-	+	+	+				22q13.1	CD131	
CD132	IL-2R γ	CK/CKR	IL-12	Common subunit of IL-2, IL-4, IL-7, IL-9, IL-15 receptors; mutation causes X-linked severe combined immunodeficiency (XSCID)	65-70/-	+	+		+		+	+	+	+		Xq13.1	CD132	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Endothelial cell	Erythrocyte	Epithelial cell	Gene locus	CD
CD133	AC133	Stem Cell	N/A	Used for positive selection of hematopoietic stem and progenitor cells for transplantation studies	120	—	—	—	—	+	—	—	—	—	+	+	4p16.2	CD133
CD134	OX40	CK/CKR	OX40 ligand	Receptor for OX40 ligand; co-stimulatory signal transducer of T cell receptor-mediated activation, cell adhesion	48–50/-	⊕	—	—	—	—	—	—	—	—	—	—	1p36	CD134
CD135	Flt3, FLK2, STK1	CK/CKR	FL	Receptor tyrosine kinase; co-stimulatory molecule; survival receptor; growth factor receptor for early hematopoietic progenitors	130/155–160	—	—	—	—	+	+	—	—	—	—	—	13q12	CD135
CDw136	MSP-R, RON	CK/CKR	MSP, HGFI	Chemotactic migration, morphological change, cell growth, cytokine induction, phagocytosis, and cell differentiation	180/150, 40	—	—	—	—	—	+	—	—	—	—	+	13p21.3	CDw136
CDw137	4-1BB, ILA	CK/CKR	4-1BB ligand	Receptor for 4-1BB ligand; co-stimulatory molecule	85/39	⊕	+	—	—	+	—	—	—	—	—	+	1p36	CDw137
CD138	Syndecan1	B		Extracellular matrix receptor; co-receptor for fibroblast growth factor signaling receptors; [#] expressed on plasma cells	—/165–150	—	+#	—	—	—	—	—	—	—	—	+	2p24.1	CD138
CD139	None	B		Function unknown	209/228	—	+	+	—	+	+	+	+	+	+	+		CD139
CD140a	PDGF a receptor	Endothelial cell	PDGF	Involved in signal transduction associated with PDGF receptors; expressed on mesenchymal cells	160, 180/-	—	—	—	—	—	—	—	+	—	—	—	4q11-q13	CD140a
CD140b	PDGF B receptor	Endothelial cell	PDGF	Involved in signal transduction associated with PDGF receptors; expressed on mesenchymal cells	160, 180/-	—	—	—	—	—	+	+	—	—	—	+	5q31-q32	CD140b
D141	Thrombomodulin	Endothelial cell	Thrombin, protein C	Critical for activation of protein C and initiation of the protein C anticoagulant pathway; co-factor in the thrombin-mediated activation of protein C	75/105	—	—	—	+	+	+	+	+	+	+	+	20p12-cen	CD141
CD142	Tissue factor	Endothelial cell	Factor VIIIa, factor Xa/TFPI	Initiator of the blood clotting cascade; cell surface receptor/cofactor for factor VII; can be induced by inflammatory mediators	45–47/45–47	—	—	—	—	—	—	—	—	—	+	+	1p22-p21	CD142

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD143	ACE	Endothelial cell	ANG-1, bradykinin	Angiotensin-converting enzyme, peptidyl dipeptidase, is necessary for spermatozoa to bind to eggs	90, 170/ 90, 170	+	-		-	-	-	-	-	+	+	17q2	CD143	
CD144	VE-cadherin, cadherin-5	Endothelial cell	β-catenin, p120 CAS	Controls endothelial permeability, growth, migration, and contact inhibition of cell growth; expressed only on endothelial cells	135/ 130	-	-	-	-	-	-	-	-	+	-		CD144	
CDw145	None	Endothelial cell		Highly expressed on endothelial cells; antibodies were originally raised against human urinary bladder carcinoma cells	25, 90, 110				-	-	-	-	-	+			CDw145	
CD146	Muc 18 S-endo	Endothelial cell		Potential adhesion molecule; expressed by melanoma, smooth muscle, and intermediate trophoblasts	118/ 130	⊕	-		-	-	-	-	-	-	+	11q23.3	CD146	
CD147	Neurothelin, OX-47	Endothelial cell		Potential adhesion molecule; involved in regulation of T cell function	50– 60/ 55–95	+	+		+	+	+	+	+	+	+	19p13.3	CD147	
CD148	HPTPn, p260 DEP-1	Non-lineage		HPTP-etc/Dep-1 involved in contact inhibition of cell growth; chromosomal location region frequently detailed in carcinoma	200– 260/ 200– 260	+		+		+	+	+	+	+	+	11p11.2	CD148	
CD150	SLAM-1, IPO-3	Non-lineage	Tyrosine phosphatase CD45	An important molecule associated with intracellular adaptor protein SAP. Absence of SAP causes X-linked lymphoproliferative disease	65– 85/ 75–95	+	+	+	-	-	-	-	-	-	+	1q22-q23	CD150	
CD151	PETA-3	Platelet	β1 integrins	Integrin-associated protein; transmembrane signaling	32/-	-	-	-		+	-	-	+	+	+	11p15.5	CD151	
CD152	CTLA-4	T		Receptor for CD80/CD86; negative regulator of T cell activation	50/33	⊕	⊕	-	-	-	-	-	-	-		2q33	CD152	
CD153	CD30L	T	CD30	Co-stimulatory signal for peripheral blood T cells	40	+		-		⊕	+					9q33	CD153	
CD154	CD40L, gp39, TRAP-1, T-BAH	T	Ligand for CD40	Essential for germinal center formation and antibody class switching; co-stimulatory molecule; regulator of TH1 generation and function	33	⊕	-	-	-	-			-	-		Xq26	CD154	
CD155	PVR	Myeloid	Polio virus receptor	Possible interaction with CD44	60–90			-		+		-				19q13.2	CD155	
CD156a	CD156, ADAM8, MS2	Myeloid	Myeloid	Possible involvement in extravasation of leukocytes	-/69					+	+					10q26.3	CD156a	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Endothelial cell	Erythrocyte	Platelet	Gene locus	CD
CD156b	TACE, ADAM17	Adhesion structure	Pro-INF1 pro-TGF α , MAD2	Cleavers the transmembrane form of TNF- α to yield the soluble active form	100–120	+	–	+	–	+	+	–	–	–	–	2p25	CD156b
CD157	Mo5, BST-1	Myeloid		A sister molecule of CD38, a type II membrane protein with identical ectoenzyme activity; a distribution complementary to that of CD38	42–45			+		+	+	+			+		CD157
CD158a [†]	KIR2DL1, p58.1	NK	HLA-Cw4, 2,5,6	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	58/58	+			+							19q13.4	CD158a [†]
CD158b1 [†]	KIR2DL2, p58.2	NK	HLA-3.1, 7, 8	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	58/58	+			+							19q13.4	CD158b1 [†]
CD158b2 [†]	KIR2DL3, p58.3	NK	HLA-Cw3, 1, 7, 8	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	58/58	+			+							19q13.4	CD158b2 [†]
CD158c1 [†]	KIR2DS6, KIRX	NK		Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity		+			+						19q13.4	CD158c1 [†]	
CD158d [†]	KIR2DL4	NK		Function unknown						+						19q13.4	CD158d [†]
CD158e1/e2 [†]	KIR3DL1/S1, p70	NK	HLA-Bw4	Involved in the suppression of NK-mediated cytotoxicity (KIR3DL1); expressed on subsets of NK and cytotoxic cells	70/70	+			+							19q13.4	CD158e1/e2 [†]
CD158f [†]	KIR2DL5	NK		Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity		+			+							19q13.4	CD158f [†]
CD158g [†]	KIR2DS5	NK		Associated with KARAP/DAP12; involved in the activation of NK-mediated cytotoxicity		+			+							19q13.4	CD158g [†]
CD158h [†]	KIR2DS1, p50.1	NK	HLA-C	Associated with KARAP/DAP12; involved in the activation of NK-mediated cytotoxicity		+			+							19q13.4	CD158h [†]
CD158i [†]	KIR2DS4, p50.3	NK	HLA-C	Associated with KARAP/DAP12; involved in the activation of NK-mediated cytotoxicity	50/50	+			+							19q13.4	CD158i [†]
CD158j [†]	KIR2DS2, p50.2	NK	HLA-C	Associated with KARAP/DAP12; involved in the activation of NK-mediated cytotoxicity		+			+							19q13.4	CD158j [†]
CD158k [†]	KIR3DL2, p140	NK	HLA-A	Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity	140/70	+			+							19q13.4	CD158k [†]

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD158z[†]	KIR3DL7, KIRC1	NK		Contains ITIM sequences in cytoplasmic tail; involved in the suppression of NK-mediated cytotoxicity													19q13.4	CD158z[†]
CD159a	NKG2A	NK	HLA-E	CD94/CD159a heterodimer constitutes a potent negative regulator of NK- T and cell activation programs; expressed on subsets of NK and CD8+ (γδ) cells	70/43	+			+								12p12.3-p13.1	CD159a
CD160	BY55, NK1, NK28	T	MHC class I	Cross-linking CD160 with certain mAbs triggers co-stimulatory signals in CD8 T cells. CD160 is also expressed on all intestinal intraepithelial lymphocytes	80/27	+	-		+								1q42.3	CD160
CD161	NKR-P1A	NK		NK cell cytolytic activity; regulation of thymocyte precursor proliferation	80/40	+	-	-	+		-	-	-	-	-			CD161
CD162	PSGL-1	Adhesion structure	P-selectin	Binds P- and L-selectins; can mediate leukocyte rolling	160-250/ 110-120	+	+			+	+	+	-	-	-	-		CD162
CD162R	PEN5	NK	L-selectin	Post-translational modification of the P-selectin glycoprotein ligand-1 (CD162); developmentally regulated marker of both immune and neural cells	240/ 140				+									CD162R
CD163	M130, GHI/61, RM3/1	Myeloid		Expressed on tissue macrophages and LPS activated monocytes	110	-	-	-		⊕	-	-	-	-	-			CD163
CD164	MGC-24, MUC-24	Adhesion structure		Facilitating the adhesion of human CD34+ cells to stroma and by negatively regulating CD34+CD38+—progenitor cell proliferation	160/ 80	+	+			+	+	-	-	-	+			CD164
CD165	Ad2, gp37	Adhesion structure		Adhesion of thymocytes to thymic epithelial cells; expressed on many T cell acute lymphoblastic leukemia (ALL)	37/42					-	+	-	+	-	+			CD165
CD166	ALCAM, KG-CAM	Adhesion structure	Binds CD6	Adhesion receptor	100-105/ 100-105	⊕	+			⊕	-			+	+			CD166
CD167a	DDR1	Adhesion structure	Collagen	Adhesion molecule, DDR1 overexpression in several human cancers suggests a function in tumor progression	52-62		+	+								+	6p21.3	CD167a
CD168	RHAMM	Adhesion structure	CD44	Involved in adhesion of early thymocyte progenitors to matrix and its interaction with HA can mediate signals to other cell adhesion molecules	52-125	-	-	+		+	+						5q33.2	CD168

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD169	Sialoadhesion/Siglec-1	Adhesion structure	MUC1, CD206	Mediates cell–cell, cell matrix interaction; may facilitate phagocytosis	180/200			+			+						20p13	CD169
CD170	Siglec-5	Adhesion structure	Terminal sialic acid residues	Adhesion molecule; as a pattern or self/non-self recognition receptor and mediates negative signals into the cell	140			+			+	+					19q13.3	CD170
CD171	N-CAM, L1	Adhesion structure	CD56, CD24	Neuronal cell recognition molecule L1 involved in cell adhesion, cell spreading and motility. Also acts as a co-stimulatory molecule on lymphocytes	200–230	+	+	+			+			+			Xq28	CD171
CD172	SIRP-1a	Adhesion structure	CD47	Adhesion molecule; binds to CD47 and may mediate inhibitory signals via the ITIM/SHP-2	65			+		+	+	+					20p13	CD172
CD173	Blood group H type 2	Carbohydrate and lectin		Biosynthetic precursor of A and B antigen; carcinoma-associated antigen; may be involved in the homing process of hematopoietic stem cells to the bone marrow					–	+			+	+			CD173	
CD174	Lewis Y	Carbohydrate and lectin		New hematopoietic progenitor cell marker; may be involved in the homing process of hematopoietic stem cells to the bone marrow					–	+				+			CD174	
CD175	Tn	Carbohydrate and lectin	TFRA	Tumor-specific antigen expressed on various carcinomas; histo-blood group-related carbohydrate antigen; precursor of the blood groups ABO and TF antigen		–	–		–	+				+			CD175	
CD175s	Sialyl-Tn (s-Tn)	Carbohydrate and lectin	TFRA	Tumor-specific antigen expressed on various carcinomas; histo-blood group-related carbohydrate antigen; precursor of the blood groups ABO and TF antigen		–	+		–	+				+	+		CD175s	
CD176	TF antigen	Carbohydrate and lectin	TFRA	Pan-carcinoma antigen tumor antigen marker; may be involved in metastasis of tumor cells	120–198		–			+			+	+	+		CD176	
CD177	NB1, HNA-2a	Myeloid		NB antigens play a critical role in autoimmune neonatal neutropenia and autoimmune neutropenia; polymorphic; expressed in 89–97% of healthy individuals	49–55/56–64					+							CD177	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD178	Fas ligand	CKR	CD95(Fas)	Involved in Fas/Fas ligand interaction, apoptosis, regulates immune responses, #Expressed on immature dendritic cells	27–40/ 27–40	⊕	–	+#	+	–	+	–	–	+	+	1q23	CD178	
CD179a	VpreB	B	CD179b, μ heavy chain	Surrogate light chain VpreB is one of the components of the pre-B-cell receptor complex. #Expressed in cytoplasm of pro-B cells and on the surface of pre-B cells	16–18/					+#						22q11.22	CD179a	
CD179b	λ5, 14.1	B	CD179a, μ heavy chain	λ5 is one of the components of the pre-B-cell receptor complex. #Expressed in cytoplasm of pro-B cells and on the surface of pre-B cells	-/22					+#						22q11.23	CD179b	
CD180	RP105/Bgp95	B	LPS, MD-1	May regulate the LPS signaling in B cells in concert with TLR4; ligation of CD180 induces proliferation of B cells and increases susceptibility to BCR-induced cell death	95–105/ 95–105		+	+			+					5q12	CD180	
CD183	CXCR3	CK/CKR	IP-10, Mig, I-TAC	Involved with inflammation-associated effector T-cell chemotaxis	40–41		+	+			+					8p12–p11.2, Xq13	CD183	
CD184	CXCR4	CK/CKR	HIV-1	Homing receptor of hematopoietic progenitor cells; co-stimulation of B cells; induces apoptosis; involved with the entry of HIV-1			+	+	+		+	+	+	+	–	+	2q21	CD184
CD195	CCR5	CK/CKR	HIV-1	Regulates lymphocyte chemotaxis activation and transendothelial migration during inflammation. Neutralizes HIV infection. #Expressed on immature dendritic cells	37.0/ 40.6		+	–	+#	–		+	+	–	–	–		CD195
CDw197	CCR7, EBI1, BLR2	CK/CKR	SLC/6Ckine, ELC/MIP-3b	Lymphocytes and dendritic cell homing to lymphoid organs	90		+	+	+	+		+	+	–	–		9p13	CDw197
CD200	OX2	Non-lineage	OX2R	Ig-SF, OX2 shares many biochemical similarities with Thy-1; may regulate myeloid cell activity	40–45		+	+	–	+	–	–	–	–	–	+		CD200
CD201	EPCR	Endothelial cells	Protein C	Involved in protein C activation	49/25										+	20q11.2	CD201	
CD202b	TEK/Tie2	Endothelial cells	Angio-poietin-1,2, and 4	Involved in vascular development	140										+	9p21	CD202b	

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Endothelial cell	Epithelial cell	Gene locus	CD	
CD203c	PDNP3, B10, PDI β , E-NPP3	Myeloid	Oligo-nucleotides	Multi-functional ectoenzyme involved in the clearance of extracellular nucleotides. [#] Expressed on basophils, mast cells, and their precursors	270/130, 150					+#	+#				6q22	CD203c	
CD204	MSR	Myeloid	LDL	Role in deposition of cholesterol through receptor mediated uptake of LDL; recognition and elimination of pathogenic microorganisms	220						+						CD204
CD205	DEC-205	Dendritic cell	Unknown	Antigen-uptake receptor for mannosylated antigens; present on both CD11c+ blood dendritic cells and in lesser density on surface of T and B cells	198	+	+	+		+	+						CD205
CD206	MMR	Dendritic cell	Sialodine sins and CD45	Mediates endocytosis of glycoconjugates with terminal mannose, fucose N-acetylglucosamine or glucose residues	162–175			+		+	+					10p13	CD206
CD207	Langerin	Dendritic cell		Found on a subset of cultured blood CD11c+ DC and TGF beta differentiated MoDC. Provides new reagent for characterizing Langerhans histiocytes. Endocytic receptor with functional lectin domain with mannose specificity				+		+	+					2p13	CD207
CD208	DG-LAMP	Dendritic cell		Function unknown. Possible participation in peptide loading onto MHC class II				+		+						3q26.3-q27	CD208
CD209	DC-SIGN	Dendritic cell		Expressed on MoDC but not on blood DC even after activation; contributes to the initial adhesion interaction between MoDC and naïve T cells, regulation of T cell proliferation	44	–	–	+								19p13	CDw209
CDw210	CK	CK/CKR	IL-10	Receptors involved with cell signaling and immune regulation	90	–	+	–								11q23.3, 21q22.11	CDw210
CD212	CK	CK/CKR	IL-12	Tyrosine kinase membrane receptor for angiopoietin; involved in cell signaling and immune regulation	-/110	⊕	–		+	–	–					19p13.1	CD212
CD213a	CK	CK/CKR	IL-13	Receptors involved in cell signaling and immune regulation. CD213a1, CD213a2		–	–		–	+	–			+	x13		CD213a
CDw217	CK	CK/CKR	IL-17	Involved in inflammation, osteogenesis, and granulopoiesis		+	+			+	+					2p31	CDw217
CD220	Insulin R	Non-lineage	Insulin	Functions in the clearance of ligands rather than intracellular signaling		+	+		–	+	+			+		19p13.3	CD220

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD	
CD221	IGF1 R	Non-lineage	Insulin	Functions in the clearance of ligands rather than intracellular signaling		+	+		+	+	+	+					15q25-26	CD221	
CD222	M6P/IGFII-R	Non-lineage	Plasminogen, M6P and IGFII	Plays role in the transport of newly synthesized acid hydrolases to lysomes	250	+	+		+	+	+	+	+					CD222	
CD223	LAG-3	Non-lineage	MHC class II	Cell activation Gene-3, like CD4, interacts with MHC class II molecules	70	⊕	–	–	⊕	+	–	–					12p13	CD223	
CD224	GGT	Non-lineage	GSH	G-glutamyl transderase; ectoenzyme; maintains intracellular glutathione (GHS) concentrations and consequently a state of oxidative homeostasis within cellular microenvironments	27–68	+	+		–	+	+	–				+		CD224	
CD225	Leu 13	Non-lineage	IFN-γ	Interferon-inducible protein may play role in controlling cell-cell interactions	17	+	+		+	+	–	–				+	–		CD225
CD226	DNAM-1, PTA1	T	LFA-1	Adhesion molecule; cytolytic function mediated by CTL and NK cells; platelet and T cell activation antigen 1	65	+	+		+	+	+	–	+	–	–		18q22.3	CD226	
CD227	MUC1	Non-lineage	CD54, CD169	Involved in cell surface protection and modulation of adhesion and cell migration	300	⊕	+	+		+	⊕					+			CD227
CD228	p97, gp95, MT	Non-lineage		GPI-anchored melanoma-associated protein	97	–	–	–		+	–	–			+			CD228	
CD229	Ly9	Non-lineage	SAP protein	In activated T cells, the SAP protein binds to and regulates signal transduction events initiated through the engagement of SLAM, 2B4, CD84, and Ly-9	100	+	+		+	–	–	–	–	–	–		1q22	CD229	
CD230	Prion Protein (PrP)	Non-lineage		Isoform PrPsc (pathological) is present in transmissible spongiform encephalitis (TSE)	33–37	+	+	+	+	+	+	+						CD230	
CD231	TALLA-1/A15, TALLA	Non-lineage		Highly expressed on T cell acute lymphoblastic leukemia; can be potentially useful as an anti-tumor agent	30–45										+			CD231	
CD232	VESP-R	Non-lineage	CD108	Receptor for CD108 and semaphorin from virus; A39R (protein of semaphorin family) upregulates ICAM-1 and induces cytokine production	200		+		+		+	+							CD232
CD233	Band 3/AE1	RBC		Carrier of the Diego blood group system; maintains red cell morphology; Band 3 is essential for terminal erythroid differentiation	95–105	–	–	–	–	–	–	–	–	+	–	17q12-q21	CD233		

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	Dendritic cell	NK cell	Macrophage/monocyte	Stem cell/precursor	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD234	DARC/Fy-glycoprotein	RBC	IL-8, MGSA RANTES, MCP-1	Carrier of the Duffy blood group system; binds to a number of chemokines to modulate the intensity of inflammatory reactions	34-43	-	-	-	-	-	-	-	-	+	+	1q22-23	CD234	
CD235a	Glycophorin A	RBC		Major membrane sialoglycoprotein of RBC membrane and carrier of blood group M and N specificities		-	-	-	-	-	-	-	-	+	-	4q28-q31	CD235a	
CD235ab	Glycophorin A and B	RBC		Glycophorin B is the carrier of blood group S, s, and N specificities (for Glycophorin A see CD235a)		-	-	-	-	-	-	-	-	+	-	4q28-q31	CD235ab	
CD236	Glycophorin C and D	RBC		One of the chored protein of red blood cell skeleton that maintains cell morphology; carrier of Gerbich blood group	30-40					+				+		2q14-q21	CD236	
CD236R	Glycophorin C, GYPC	RBC		Plays a role in the invasion and intra-erythrocytic development of <i>P. falciparum</i>	40									+		2q14-q21	CD236R	
CD238	Kell	RBC	Endothelin-3	Kell is classified as a member of the small neprilysin (M13) family of zinc metalloproteases, which include CD10. Kell antibodies inhibit erythropoiesis	93									+		7q33	CD238	
CD239	Lu/B-CAM	RBC	Laminin	Carrier of the Lutheran blood group; receptor for laminin; plays role in terminal erythroid differentiation; facilitates trafficking of more mature RBC	78-85									+	+	19q13.2	CD239	
CD240		RBC		CD240 includes CD240CE (RhCE), CD240D (RhD), and CD240DCE (RhD/RhCE). Rh system is one of the most polymorphic in the blood group system comprising 45 different antigens; Rh antigen may promote export of ammonium	30									+		1p34.3-p36.1	CD240	
CD241	RhAG/Rh50	RBC		Promotes export of ammonium that accumulates within erythrocytes; promotes erythrocyte-mediated retention of ammonium from the plasma and its release to detoxifying organs	50	-	-	-	-	-	-	-	-	-	+		6p11-p21.1	CD241
CD242	ICAM-4/LW	RBC	LFA-1, Mac-1, VLA-4	Carrier of LW blood group system; involved in red cell senescence; interaction with VLA-4 may stabilize erythroblastic islands in normal BM	37-43	-	-	-	-	+	-	-	-	-	+	+	19p13.3	CD242
CD243	MDR-1	Stern/progenitor cells		p-glycoprotein, drug resistance pump	180	-	-		-	+	-	-	-	-	-			CD243

Table 3.5 Human leukocyte differentiation antigens (*continued*)

CD	Alternative name	HLDA section	Ligand/receptor/substrate/associated molecule	Description and function	MW (kDa)	T cell	B cell	NK cell	Dendritic cell	Stem cell/precursor	Macrophage/monocyte	Granulocyte	Platelet	Epithelial cell	Endothelial cell	Erythrocyte	Gene locus	CD
CD244	2B4, P38, NAIL	NK	CD48	Engagement of 2B4 with its ligand, CD48, or with specific antibodies enhances NK cell cytokine production and cytolytic function. [#] Found only on basophils	70/70	+		+			+	+#					1q22	CD244
CD245	p220/240	T	Lymphocyte receptor	Signal transduction and co-stimulation of T and NK cells; function is distinct from CD45 or CD148	220-250	+	+				+	+	+	-				CD245
CD246	ALK	T	Tyrosine kinase R	Expressed in T cell lymphoma subtype; suggested role in cellular proliferation, apoptosis and embryonic neural differentiation	200									+			2p23	CD246
CD247	Zeta chain	T		Essential signal sub-unit of activating receptor on T and NK cells			+			+							2p23	CD247

Key:

+ Positive

⊕ Positive upon activation

+^c Positive by cytoplasm staining

- Negative

+# Refer to 'Description and function' column for further details

* A CD nomenclature of detailing LIR/ILT genes (CD85) as well as KIR genes (CD158) has been proposed based on the previous

† CD designation of some members of this family and on the position of the genes on chromosomes 19q13.4 from centromeric to telomeric loci

Abbreviations:

MW Molecular weight is shown as non-reduced/reduces where available

CK/CKR Cytokine/chemokine receptors

Table 3.6 Human leukocyte differentiation antigens

CD no.	Session	Main antigen expression	Family
CD1a	T	Cortical mature thymocytes, dendritic cell subset, Langerhans cells	IgSF
CD1b	T	Cortical mature thymocytes, dendritic cell subset, Langerhans cells	
CD1c	T	Cortical mature thymocytes, dendritic cell subset, Langerhans cells, B cell subset	
CD1d	T	Cortical thymocytes, dendritic cell subset, Langerhans cells, intestinal epithelium	
CD1e	T	Cortical thymocytes, dendritic cell subset	
CD2	T	Thymocytes, T cells, most NK cells, B cells	IgSF
CD2R	T	Activated T cells, NK cells	
CD3d	T	T cells	T cell receptor complex
CD3e	T	T cells	
CD3g	T	T cells	
CD3z	N	T cells, NK cells, macrophages	ND
CD4	T	Helper/inducer T cells, monocyte subset, thymocyte subset, macrophages	IgSF
CD5	T	Mature T cells, thymocytes, B cell subset	SRCR
CD6	T	Mature T cells, B cell subset, medullary thymocytes	SRCR
CD7	T	Mature T cells, NK cells, immature myeloid cell subset	IgSF
CD8a	T	Cytotoxic/suppressor T cells, NK cell subset, thymocytes	T cell coreceptor
CD8b	T	Cytotoxic/suppressor T cells, NK cell subset, thymocytes	
CD9	P	Platelets, activated T cells, eosinophils, basophils, endothelial cells, pre-B cells	TM4SF
CD10	B	Pre-B cell subset, B cell subset, cortical thymocyte subset, granulocytes, monocyte subset	Zinc metalloprotease
CD11a	Ad	Most of lymphoid and myeloid cells	Integrin a chain
CD11b	Ad	Myeloid cells and NK cells	Integrin a chain
CD11c	Ad	Myeloid cells, NK cells macrophages, activated T cells	Integrin a chain
CD11d	Ad	Leucocytes	Integrin a chain
CDw12	M	Monocytes, granulocytes, platelets, NK cells	–
CD13	M	Monocytes, neutrophils	–
CD14	M	Monocytes, macrophages, Langerhans cells	LRG
CD15	Ad	Neutrophils, eosinophils, monocytes, Reed Sternberg cells	Carbohydrate 2
CD15s	Ad	Neutrophils, basophils, monocytes	Sialylated carbohydrate 2

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD15u	Ca		
CD16a	N	NK cells, macrophages, mast cells, monocytes	IgSF
CD16b	N	Granulocytes neutrophil only	IgSF
CDw17	M	Neutrophils, basophils, monocytes, platelets, B cell subset	LacCer
CD18	Ad	Leucocytes	Integrin
CD19	B	Precursor B cells and B cells, follicular dendritic cells	IgSF
CD20	B	Precursor B cell subset, B cells	CD20 family
CD21	B	Mature B cells, follicular dendritic cells, thymocyte subset	RCA
CD22	B	Precursor and mature B cells	IgSF
CD23	B	B cells, monocytes, follicular dendritic cells	C-type lectin
CD24	B	B cells, granulocytes	CD52/CD24/HSA
CD25	Ck	Activated T and B cells, stimulated monocytes/macrophages	–
CD26	X	Mature thymocytes, activated T cells, B cells, macrophages, NK cells	Serine-type exopeptidase
CD27	T	Mature T cells, B cell subset, NK cells	TNF receptor family
CD28	T	Mature thymocytes subset, T cells, plasma cells	IgSF
CD29	Ad	Broad	Integrin
CD30	X	Activated T and B cells, activated NK cells, monocytes, Reed Sternberg cells	TNF receptor family
CD31	Ad	Platelets, endothelial cells, monocytes, NK cells, neutrophils, T cell subset	IgSF
CD32	M	Broad except NK cells	Fc receptor
CD33	M	Pan myeloid, majority of monocytic cells	Sialoadhesin family, IgSF
CD34	M	Hematopoietic precursor cells, endothelial cells	Sialomucin
CD35	M	Neutrophils, eosinophils, monocytes, follicular dendritic cells, B cells, erythrocytes, T cell subset RCA	
CD36	P	Platelets, monocytes, macrophages, early erythroid cells, endothelial cells	–
CD37	B	B cells, weak on T cells, monocytes, granulocytes	Tetraspan
CD38	B	Plasma cells, majority of hemopoietic cells	ADP-ribosyl cyclase
CD39	B	Mantle zone B cells, activated T cells, NK cells, dendritic cells, Langerhans cells, monocytes	Ecto-apyrase
CD40	B	B cells, macrophages, follicular dendritic cells, endothelial cells, platelets	TNF/NGF receptor
CD41	P	Platelets and platelet precursors	Integrin
CD42a	P	Platelets, megakaryocytes	LGR

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD42b	P	Platelets, megakaryocytes	LGR
CD42c	P	Platelets, megakaryocytes	LGR
CD42d	P	Platelets, megakaryocytes	LGR
CD43	X	Broad, except resting B cells	Sialomucin
CD44 and CD44S	Ad	Most cell types	Hyaladherin
CD44R	Ad	Epithelial cells, monocytic cells	—
CD45	X	All hematopoietic cells	PTPase
CD45RA	X	Naive resting T cells, medullary thymocytes	
CD45RB	X		
CD45RC	X		
CD45RO	X	Memory-activated T cells, cortical thymocytes	
CD46	X	Broad	RCA
CD47	Ad	Broad	IgSF
CD47R	X	Broad	
CD48	X	Pan leukocyte	IgSF
CD49a	Ad	Activated T cells, monocytes, NK cells, endothelial cells	Integrin
CD49b	Ad	Platelets, megakaryocytes, NK cells, endothelial cells	Integrin
CD49c	Ad	Non-hematopoietic cells	Integrin
CD49d	Ad	Broad	Integrin
CD49e	Ad	Broad	Integrin
CD49f	Ad	Broad (except erythrocytes)	Integrin
CD50	Ad	Leukocytes, endothelial cells, epidermal Langerhans cells	IgSF
CD51	P	Platelets, endothelial cells, activated T cells, B cell subset	Integrin
CD52	X	Thymocytes, lymphocytes, monocytes, macrophages	CD52/CD24/HSA
CD53	X	Pan leukocyte	TM4SF
CD54	Ad	Activated endothelial cells, activated T and B cells, monocytes	IgSF
CD55	X	Broad	RCA
CD56	N	NK cells, T cell subset	IgSF
CD57	N	NK cell subset, T cell subset	—
CD58	Ad	Broad	IgSF

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD59	X	Broad	Ly6
CD60a	Ca	T cell subset, platelets	Glycolipid
CD60b	Ca		Glycolipid
CD60c	Ca		Glycolipid
CD61	P	Platelets, megakaryocytes	Integrin
CD62E	Ad	Endothelial cells	Selectin
CD62L	Ad	T and B cells, monocytes, granulocytes, some NK cells	Selectin
CD62P	Ad	Platelets, megakaryocytes, activated endothelial cells	Selectin
CD63	P	Activated platelets, monocytes, degranulated neutrophils, endothelium	Tetraspan, TM4SF
CD64	M	Monocytes, macrophages, dendritic cell subset	IgSF
CD65	M	Granulocytes (monocytes)	poly-N-acetyllactosamine
CD65s	M	Granulocytes, monocytes	poly-N-acetyllactosamine
CD66a	M	Granulocytes and epithelial cells	IgSF, CEA
CD66b	M	Granulocytes	IgSF, CEA
CD66c	M	Granulocytes and epithelial cells	IgSF, CEA
CD66d	M	Granulocytes	IgSF, CEA
CD66e	M	Epithelial cells	IgSF, CEA
CD66f	M	Myeloid cell lines, fetal liver, placental syncytiotrophoblasts	IgSF, CEA
CD67		<i>cancelled: now CD66b</i>	
CD68	M	Monocytes, macrophages, dendritic cells, neutrophils, myeloid progenitor cells	Sialomucin
CD69	N	Activated T and B cells, thymocytes, NK cells, neutrophils, eosinophils	C-type lectin
CD70	X	Activated B and T cells	TNF
CD71	X	Proliferating cells, reticulocytes, erythroid precursors	Transferrin receptor
CD72	B	Pan B, including progenitors	C-type lectin
CD73	B	B and T cell subsets, follicular dendritic cells, epithelial cells, endothelial cells	GPI-anchored
CD74	B	B cells, activated T cells, macrophages, activated epithelial and endothelial cells	–
CD75	Ca	Mature B cells, T cell subset	Lactosamine
CD75s	Ca	Mature B cells, T cell subset	Sialylated lactosamine
CDw76		<i>cancelled: now CD75s</i>	

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD77	B	Burkitt's lymphoma cells, germinal center B lymphocytes	Carbohydrate
CDw78		<i>cancelled</i>	
CD79a	B	B cells	IgSF
CD79b	B	B cells	IgSF
CD80	B	Activated B and T cells, macrophages	IgSF
CD81	B	Broad hemopoietic, endothelial and epithelial cells	Tetraspan
CD82	B	Broad	Tetraspan
CD83	B	Circulating and interdigitating reticular dendritic cells, Langerhans cells	IgSF, Siglec
CD84	B	Mature B cells, monocytes, macrophages, platelets, thymocytes and T cell subset	–
CD85a	D	Monocytes, macrophages, granulocytes, dendritic cells, T cell subset	IgSF
CD85b	D	Monocytes, macrophages, dendritic cells	IgSF
CD85c	D		IgSF
CD85d	D	Monocytes, macrophages, dendritic cells	IgSF
CD85e	D	Monocytes	IgSF
CD85f	D		IgSF
CD85g	D	Monocytes	IgSF
CD85h	D	Monocytes, dendritic cell subset, macrophages, granulocytes, NK subset	IgSF
CD85i	D	Monocytes	IgSF
CD85j	D	Monocytes, macrophages, dendritic cells, NK subset, T cell subset, B cells	IgSF
CD85k	D	Monocytes, macrophages, dendritic cells	IgSF
CD85l	D		IgSF
CD85m	D		IgSF
CD86	B	Memory B cells, monocytes, dendritic cells, endothelial cells and activated T cells	IgSF
CD87	M	T cells, NK cells, monocytes and neutrophils as well as non-hemopoietic cells	GPI-anchored
CD88	M	Granulocytes, monocytes, dendritic cells	Rhodopsin
CD89	M	Myeloid cells	IgSF, Fc receptor, MIRR
CD90	En	Hemopoietic stem cells, neurons	IgSF, GPI linked
CD91	M	Monocytes, macrophages, neurons, fibroblasts	LDL receptor
CD92	M	Monocytes, granulocytes	–

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CDw93	M	Monocytes, granulocytes, endothelial cells	
CD94	N	NK cells, g/d and a/b T cell subsets	C-type lectin
CD95	Ck	Broad including activated T and B cells	TNF/NGF receptor
CD96	N	Activated T and NK cells	IgSF
CD97	X	Activated T and B cells, monocytes, granulocytes	EGF-TM7
CD98	X	Broad on activated cells	
CD99	T	Broad, including lymphocytes	
CD99R	T	Restricted hematopoietic expression	
CD100	X	Broad	Semaphorin
CD101	M	Granulocytes, monocytes, dendritic cells, activated T cells	IgSF
CD102	Ad	Resting lymphocytes, monocytes, platelets, vascular endothelial cells	IgSF
CD103	Ad	Mucosa associated T lymphocytes	Integrin
CD104	Ad	Epithelial cells, keratinocytes, Schwann cells, monocytes, endothelial cells	Integrin
CD105	En	Activated monocytes, endothelial cells, stromal cells, pre-B cells	TGF receptor
CD106	En	Follicular dendritic cells, activated endothelium	IgSF
CD107a	P	Degranulated platelets, activated neutrophils, activated T cells	
CD107b	P	Degranulated platelets, activated neutrophils	
CD108	X	Erythrocytes, circulating lymphocytes	
CD109	Ca	Activated T cells and platelets, endothelial cells	
CD110	P	Hematopoietic stem and progenitor cells, megakaryocytes, platelets	IgSF
CD111	M	CD34+ hematopoietic progenitors, epithelial and neuronal cells	IgSF
CD112	M	CD34+ hematopoietic progenitors, epithelial and endothelial cells	IgSF
CD113		<i>NA (reserved)</i>	
CD114	M	Granulocytes, monocytes, mature platelets, endothelial cells	Class I CK-R
CD115	M	Monocytes, macrophages and their precursors, placenta	IgSF, tyrosine kinase R
CD116	Ck	Macrophages, neutrophils, eosinophils, dendritic cells and their precursors	IgSF, class I CK-R
CD117	Ck	Hematopoietic progenitor cells, tissue mast cells	IgSF, tyrosine kinase R
CD118		<i>NA (reserved)</i>	
CDw119	Ck	Broad	IgSF, class II CK-R
CD120a	Ck	Broad	TNF receptor
CD120b	Ck	Broad	TNF receptor

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD121a	Ck	Broad	IgSF
CDw121b	Ck	B cells, myeloid cells, some T cells	IgSF
CD122	Ck	NK cells, T cells and B cells, monocytes/macrophages	IgSF, CK-R
CD123	Ck	Myeloid cells including early progenitors endothelial cells	IgSF, class I CK-R
CD124	Ck	Broad	IgSF, CK-R
CDw125	Ck	Eosinophils, activated B cells, basophils	IgSF, CK-R
CD126	Ck	T cells, monocytes, activated B cells	IgSF, class I CK-R
CD127	Ck	T cells, B cell precursors	IgSF, CK-R
CDw128a	Ck	Neutrophils, T cell subset, monocytes, endothelial cells, fibroblasts, platelets	Chemokine receptor
CDw128b	Ck	Neutrophils, T cell subset, monocytes, melanocytes	Chemokine receptor
CD129		NA (<i>reserved IL-9R</i>)	
CD130	Ck	Broad	Class I CK-R
CDw131	Ck	Myeloid cells, early B cells	Class I CK-R
CD132	Ck	T and B cells, NK cells, monocytes/macrophages, neutrophils	Class I CK-R
CD133	S	CD34+ hematopoietic progenitors, neural and endothelial stem cells	5-TM
CD134	Ck	Activated T cells	TNF/NGF receptor
CD135	Ck	Early and lymphoid committed progenitors	Tyrosine kinase receptor
CDw136	Ck	Broad	Tyrosine kinase receptor
CDw137	Ck	T cells	TNF receptor
CD138	Ad	Pre-B cells, plasma cells	Syndecan
CD139	B	B cells, monocytes, granulocytes, follicular dendritic cells	–
CD140a	En	Fibroblasts, smooth muscle cells, platelets	Split-tyrosine kinase
CD140b	En	Fibroblasts, smooth muscle cells, monocytes, neutrophils, endothelial cells	Split-tyrosine kinase
CD141	En	Endothelial cells, monocytes, neutrophils, megakaryocytes, platelets	C-type lectin
CD142	En	Epithelial cells, stromal cells, keratinocytes	Serine protease cofactor
CD143	En	Endothelial and epithelial cells, activated macrophages	Peptidylpeptidase
CD144	En	Endothelial cells	Cadherin
CDw145	En	Endothelial cells, some stromal cells	
CD146	En	Endothelial cells, smooth muscle cells, activated T cells, melanoma cells	IgSF

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD147	En	Leukocytes, red blood cells, platelets and endothelial cells	IgSF
CD148	X	Granulocytes, monocytes, resting T cells, dendritic cells, platelets, fibroblasts	RPTPase type III, phosphatase
<i>CDw149</i>		<i>cancelled: now CD47R</i>	
CD150	X	Thymocytes, B cells, T cell subset, dendritic cells, endothelial cells	IgSF
CD151	P	Platelets, megakaryocytes, endothelial and epithelial cells	Tetraspan
CD152	T	Activated T and B cells	IgSF
CD153	T	Activated T cells, activated macrophages, neutrophils, B cells	TNF
CD154	T	Activated CD4 ⁺ T cells	TNF
CD155	M	Monocytes, broad tissue distribution	IgSF
CD156a	M	Monocytes, neutrophils	ADAM
CD156b	M	Broad	ADAM
CD157	M	Granulocytes, monocytes, bone marrow stromal cells	ADP-ribosyl cyclase
CD158a	N	NK cell subset, minor subset of T cells	IgSF
CD158b1	N	NK cell subset, minor subset of T cells	IgSF
CD158b2	N	NK cell subset, minor subset of T cells	IgSF
CD158c	N	NK cell subset, minor subset of T cells	IgSF
CD158d	N	NK cell subset, minor subset of T cells	IgSF
CD158e1	N	NK cell subset, minor subset of T cells	IgSF
CD158e2	N	NK cell subset, minor subset of T cells	IgSF
CD158f	N	NK cell subset, minor subset of T cells	IgSF
CD158g	N	NK cell subset, minor subset of T cells	IgSF
CD158h	N	NK cell subset, minor subset of T cells	IgSF
CD158i	N	NK cell subset, minor subset of T cells	IgSF
CD158j	N	NK cell subset, minor subset of T cells	IgSF
CD158k	N	NK cell subset, minor subset of T cells	IgSF
CD158z	N	NK cell subset, minor subset of T cells	IgSF
CD159a	N	NK cell subset, T cells, thymocytes	C-type lectin
CD160	N	NK cells, cytotoxic T cells	IgSF
CD161	N	NK cells, T cells	C-type lectin
CD162	Ad	Monocytes, granulocytes, T cells, some B cells	Sialomucin
CD162R	N	NK cell subset	

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD163	M	Monocytes, macrophages	Scavenger receptor
CD164	Ad	Monocytes, B cells (weak expression), CD34 ⁺ progenitor cells, bone marrow stromal cells, epithelial cells	Sialomucin
CD165	Ad	Lymphocyte subset, monocytes, platelets, thymocytes	
CD166	Ad	Activated T cells, activated monocytes, epithelium fibroblasts, neurons	IgSF
CD167a	Ad	Epithelial cells	Kinases
CD168	Ad	Broad	
CD169	Ad	Macrophages	IgSF
CD170	Ad	Neutrophils, macrophages	
CD171	Ad	Neurons, some epithelial cells and some lymphoid and myelomonocytic cells	IgSF
CD172a	Ad	Stem cells, monocytes, T cell subset	
CD173	Ca	Red blood cells, platelets, CD34 stem cell subset	Blood group antigen
CD174	Ca	Epithelial and endothelial cells, granulocytes, CD34 stem cell subset	Blood group antigen
CD175	Ca	Stem cell subset	
CD175s	Ca	Erythroblasts	
CD176	Ca	Stem cell subset	
CD177	M	Neutrophil subset	
CD178	Ck	Lymphoid cells	TNF
CD179a	B	Pro-B and early pre-B cells	IgSF
CD179b	B	Pro-B and early pre-B cells	IgSF
CD180	B	Mantle and marginal zone B cells, monocytes, dendritic cells	Toll-like receptor family
<i>CD181-CD182</i>		<i>NA (reserved)</i>	
CD183	Ck	T cells, plasmacytoid dendritic cells, subsets of NK and B-cells, eosinophils	Chemokine receptor
CD184	Ck	Broad in blood and tissue cells, CD34 stem cell subset	Chemokine receptor
<i>CD185-CD194</i>		<i>NA (reserved)</i>	
CD195	Ck	Monocytes, T cell subset	
<i>CD196</i>		<i>NA (reserved)</i>	
CDw197	Ck	Peripheral T and B cells, bone marrow and cord blood CD34 ⁺ HPC, dendritic cells	Chemokine receptor
<i>CD198-CD199</i>		<i>NA (reserved)</i>	
CD200	X	Thymocytes, B cells, activated T cells	

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD201	En	Endothelial cell subset	CD1/MHC super family
CD202b	En	Endothelial cells, stem cells	Tyrosine kinase receptor
CD203c	M	Basophils, mast cells	Ectoenzyme
CD204	M	Macrophages	
CD205	D	Dendritic cells	C-type lectin
CD206	D	Dendritic cells, macrophages	C-type lectin
CD207	D	Langerhans cells	C-type lectin
CD208	D	Interdigitating dendritic cells, mature dendritic cells	LAMP family
CD209	D	Dendritic cell subsets	C-type lectin
CDw210	Ck	T and B cells, NK cells, monocytes, macrophages	
<i>CD211</i>		<i>NA (reserved)</i>	
CD212	Ck	Activated T cells, activated NK cells	
CD213a1	Ck	Basophils, mastocytes	
CD213a2	Ck	B cells, monocytes	
<i>CD214-CD216</i>		<i>NA (reserved)</i>	
CDw217	Ck	Monocytes, erythroblasts	
<i>CD218-CD219</i>		<i>NA (reserved)</i>	
CD220	X	Broad	
CD221	X	Broad	
CD222	X	Broad	Lectins
CD223	X	Activated T cells, activated NK cells	
CD224	X	Vascular endothelium, peripheral blood macrophages, activated T cells, CD45RO ⁺ T cells, B cell subset	Membrane-bound ectoenzyme
CD225	X	Broad	
CD226	T	NK cells, platelets, monocytes, subset of T cells, thymocytes	IgSF
CD227	X	Granular and ductal epithelial cells	Mucin
CD228	X	Melanoma cells, progenitor cells	Transferrin family, GPI anchor
CD229	X	T and B cells	
CD230	X	Broad	
CD231	X	T cell acute lymphoblastic leukemia, neuroblastoma cells	TM4SF

Table 3.6 Human leukocyte differentiation antigens (*continued*)

CD no.	Session	Main antigen expression	Family
CD232	X	Broad	
CD233	Q	Erythrocyte plasma membrane	Bicarbonate transporter
CD234	Q	Erythroid cells, endothelial cells, some epithelial cells	Chemokine receptor
CD235a	Q	Red blood cells, erythroid precursor cells	
CD235b	Q	Red blood cells, erythroid precursor cells	
CD235ab	Q	Red blood cells, erythroid precursor cells	
CD236	Q	Red blood cells, stem cell subset	
CD236R	Q	Red blood cells, stem cell subset	
CD237		NA (reserved)	
CD238	Q	Red blood cells, stem cell subset	Neutral endopeptidase
CD239	Q	Red blood cells, stem cell subset	IgSF
CD240CE	Q	Red blood cells	
CD240D	Q	Red blood cells	
CD240DCE	Q	Red blood cells	
CD241	Q	Red blood cells	
CD242	Q	Erythrocytes, lymphocytes	IgSF
CD243	S	Stem cells, NK cells, T cells, Tumor cells	ABC transporters
CD244	N	NK cells, T cell subset, monocytes, basophils	IgSF
CD245	T	T cell subset	
CD246	T	Anaplastic T cell leukemia	
CD247	T	T cells, NK cells	

Session keys:

Ad	Adhesion	M	Myeloid cells
B	B cells	N	NK cells
Ca	Carbohydrates/lectins	P	Platelets
Ck	Cytokines/chemokines	S	Stem cells
D	Dendritic cells	T	T cells
En	Endothelial cells	X	Blind panel
Er	Erythroid cells		